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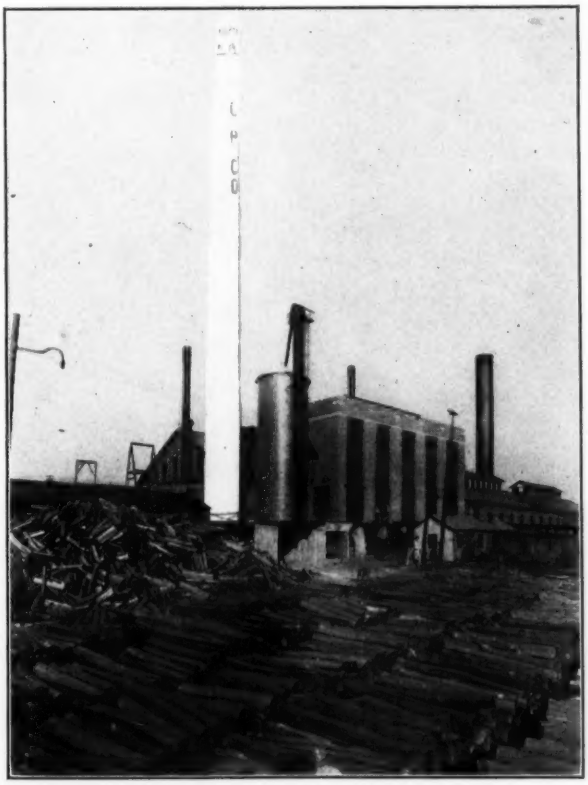
Columbian Paper Co. Installs New Boiler Plant

Concrete, Brick, and Steel Building Houses Three High Pressure Water Tube Boilers — Two Boilers Will Be Operated Under Normal Load Conditions—Third Boiler Will Be Used As Spare Unit—Railroad Track Adjoins Plant Along South Side—Engineers Designed Plant for Economical and Reliable Service

COLUMBIAN Paper Company, of Buena Vista, Va., is the pioneer company of the South manufacturing soda pulp, and in fact, due to its unusual history, it may be considered the successor to the original company producing soda pulp in the country. The soda pulp process was patented by Hugh Burgess, and Mr. Burgess for many years managed the original soda mill which was known as the American Wood Paper Company in Pennsylvania. For many years, Samuel H. Egolf was associated with Mr. Burgess, and, in fact, succeeded him as manager of the American Wood Paper Company, so that when the Buena Vista mill of the Columbian Paper Company was built in 1892 with Mr. Egolf as general manager, he probably had had more experience and information in the manufacturing of soda pulp than any one person, which no doubt had a great deal to do with the success of this company.

Soda Pulp Mill Efficient

Within a few years, they found it necessary to either increase their Buena Vista plant or build a new one to take care of their growing trade, so that they decided in 1900 to build a soda pulp mill at Bristol, Va. This mill today is producing 100 per cent more soda pulp than it was originally designated for. The power for this plant was taken care of by adding some additional boilers from time to time and buying electric power, but had not kept pace with the rest of the plant.



NEW POWER PLANT AT BRISTOL, VA.

Steam and Power Situation Studied

It was decided to employ the W. E. Biggs Engineering Company of Chattanooga, Tennessee, to make a thorough study of the entire steam and power situation. On their recommendation, it was decided to build a new high pressure boiler plant that the engineers felt would take care of their steam requirements and generate enough electric power to take care of their present needs and electric current to make chlorine gas.

The new boiler house consists of a concrete, brick and steel building 48 feet wide, 85 feet long and 61 feet high, housing three 615 hp. water tube boilers designed for 250 pounds working pressure 125 degrees F. superheat. They are equipped with five Retort 25 Tuyere Power dump Taylor Underfeed Stokers designed to develop 250 per cent of boiler rating. Two boilers will be operated under normal load conditions, leaving the third boiler as a spare unit.

Coal Discharging System

There is a railroad track along the south side of the boiler house approximately 12 feet above normal ground level. Coal is received in drop bottom cars on the track where it is dropped into a track hopper with plate feeder which feeds the coal into a roll crusher which discharges into a bucket ele-

vator. This elevator discharges into a 200-ton storage silo from which the coal feeds by gravity into 3000-pound traveling weigh-larry discharging into the stoker hoppers.

The ash is discharged by steam operated dumps into the Allen-Sherman-Hoff Hydrojet-ash handling system located in the basement. A reinforced concrete stack 210 feet high, 9 feet in diameter at top serves the three boilers.

Plant Unusually Well Equipped

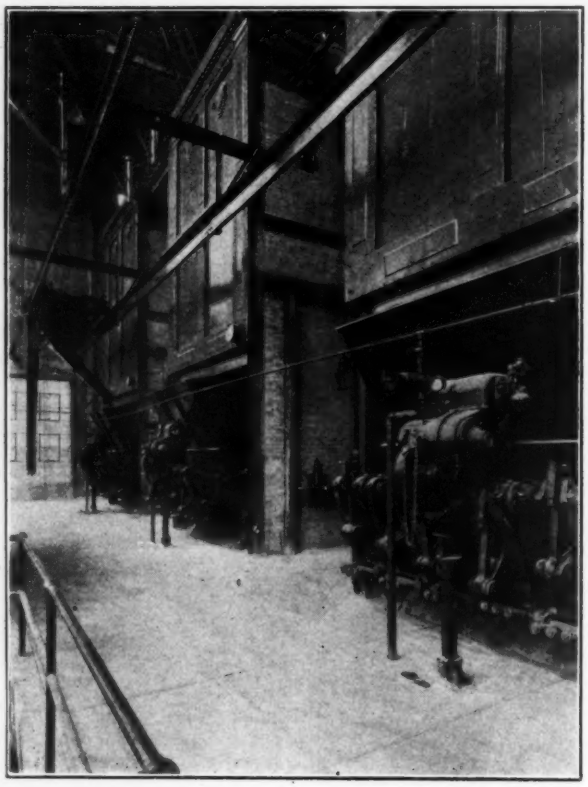
For an industrial plant, the installation is unusually well equipped with instruments for indicating and recording the various factors which vitally effect the economy of the plant. The instrument board is located in front of the boilers and near the center of the building. Complete automatic combustion control is maintained by the Hagan Combustion Control System, and the combustion is checked by means of a Brown Electric CO_2 Recorder. Steam flow, steam temperature and pressure, together with feedwater temperature, are all recorded by Brown recording instruments located on the instrument board. The construction of the plant is now nearing completion and will be in operation the latter part of October.

The Principal Equipment

In designing the plant, the engineers have put forth every effort to produce a simple, compact plant which will give economical and reliable service. The principal equipment is as follows:

General

Boiler hp. installed: 1845
Steam pressure, pounds per square inch Gage: 250
Location: Bristol, Virginia
Boiler House, approximate dimensions: 48 feet by 85 feet by 61 feet high
Construction: built by Fiske-Carter Construction Co., Greenville, S. C.
Designing and supervising engineers: W. E. Biggs Engineering Co., Chattanooga, Tenn.



MODERN STOKER FIRED BOILERS.

Boilers

Number and make: three—B & W set singly
Type: Class XX11—No. 20 Stirling W. T., lower drum 13 feet above floor line
Heating surface: square feet, 6150 each
Size of tubes: 3¼in.
Arrangement: 20-wide, 20-deep
Drums, diam. by length by thickness:
Front, 36 inches by 11 feet—9½ inches by ⅜ inch
Middle, 42 inches by 11 feet—9⅛ inches by 12 inches
Rear, 42 inches by 11 feet—9½ inches by 1-3/32 inches
Mud, 48 inches by 11 feet—10½ inches by 1-7/32 inches
Projected grate area, square feet: 99.1
Ratio heating surface to grate area: 6.261
Furnace volume, cubic feet: 2540
Ratio heating surface to furnace volume: 2.52 to 1
Ratio furnace volume to grate area: 25.4 to 1
Boiler pressure, pounds per square inch: 250
Superheat degrees F.: 125
Total steam temperature, degrees F.: 531
Blow-off valves: Yarway—Tandem, Yarnall-Waring Co.
Non-return valves: Crane—Angle type, Crane Co.
Safety valves: Consolidated—Consolidated Ashcroft Hancock Co.
Soot blowers: Diamond—six units per boiler—Diamond Power Specialty Corporation
Water columns: Yarway—H. & L. Alarm with Sesure glass—Yarnall-Waring Co.

Superheaters

Number and make: three—Babcock & Wilcox
Type: U-Tube—2 inch tubes
Superheat degrees F.: 125
Total final temperature of steam, degrees F.: 531

Stokers, Furnaces, Draft Equipment, Etc.

Settings: Brooks-Fisher Co., Atlanta, Ga.
Stokers, No. and type: three—25 Tuyere—Power Dump Taylor; Underfeed Stokers—American Engineering Co.
Size: five—Retort
Dimensions, feet.-in.: 8 feet-9 inches by 11 feet-3⅞ inches
Projected area, square feet: 99
Dump: steam operated
Drive: Terry turbine
Feed water heaters: Elliott Deaerating, Elliott Co.
Capacity, pounds per hour: 100,000
Max. pressure, pounds per square inch: 10
Measuring: Yarnall-Waring, V-Notch Meter
Steam control: None
Water control: Elliott Float
Feed water regulators: Copes, Northern Equipment Co.
Back pressure relief valve: Cochrane—Multiport, Cochrane Corp.
Forced draft fans: 2—Clarage—Type F. D.
Capacity, boiler hp.: 1845
Drive: 1—Direct connected to 60 hp. Terry turbine, Terry Steam Turbine Co.
1—Direct connected to 60 hp. General Electric Variable speed slip ring motor, General Electric Co.
Regulator: Hagan Corporation
Balanced draft: Hagan Corporation, air operated
Draft gages: Ellison Draft Gage Co.
Stack: Concrete, Rust Engineering Co.
Height, feet: 210
Diameter, top, inside, ft. in.: 9 ft. 0 in.
Lined: 40 ft. above breeching
Air ducts and breechings: Bristol Steel & Iron Co.

Coal and Ash Handling

Coal handling system: Fairfield Engr. Co.
Coal conveyors: 14 inches by 7 inches: Vertical Bucket Elevator, 200 feet per minute, 84 feet centers
Capacity, tons per hour: 35
Coal storage: Reinforced glazed tile silo, 18 feet diameter by 60 feet high Capacity, tons: 200
Traveling weigh-larry: 3000 lbs. capacity, Buffalo Scale Co.
Hydrojet-Ash handling system: Allen-Sherman-Hoff Co.

Boiler Feed Pumps

Boiler feed pumps, No: two—(one reserve)
Make: Goulds, Goulds Pump Co.
Type: 5″—5 Stage, Centrifugal
Capacity, G.p.m.: 300
Pressure, ft. head: 700
Drives:
One—Direct connected to Elliott 100 hp. Induction Motor, Elliott Co.
One—Direct connected to Elliott Turbine, Elliott Co.

Building

Dimensions: 48 feet by 85 feet by 61 feet high
Structural steel: Virginia Bridge & Iron Co.
Roof: Barrett, applied by G. G. Ray & Co.

Boiler Water Treatment

Hot Lime-Soda treatment
Filters: Two—Pressure Type, Permutit Co.
Secondary treatment: Hagan Phosphate by Hall Laboratories

Piping and Conveying

Contractor, piping: Crane Co.
Steam header: 10 in. welded nozzle
Steam piping: Van Stone Joints, Steel Flanges
Gaskets: Cranite-Asbestos Fibre
Steam separator: 2½″ 250 lb., Crane Co.
Gate and check valves: Crane Co.
Globe valves: Crane Co.
Small valves: Crane Co.

Miscellaneous

Recording pressure and temperature gages: Brown Instrument Co.
Indicating pressure and temperature gages: Brown Instrument Co.
Thermometers: Taylor Instrument Co.
CO_2 recorder: Brown Instrument Co.
Steam flow meters: Brown Instrument Co.

Second Unit Begins Operating At St. Helens

New Beloit Fourdrinier Light Weight Paper Machine of St. Helens Pulp & Paper Co. Has Trim of 192 Inches and Maximum Speed of 1,500 ft. Per Minute—Takes Wire 202 Inches Wide by 75 ft. Long—Transfer Roll Equipped With Creping Device

LATE in the year of 1926 the mill of the St. Helens Pulp and Paper Company began operations. The original set-up of this, the first all-sulphate mill in the Pacific Northwest, consisted of one 156 inch trim, Beloit Fourdrinier paper machine. It was, therefore, with a great deal of satisfaction that the management saw the second machine begin operations during the month of May 1931, approximately four and one-half years after the first machine started.

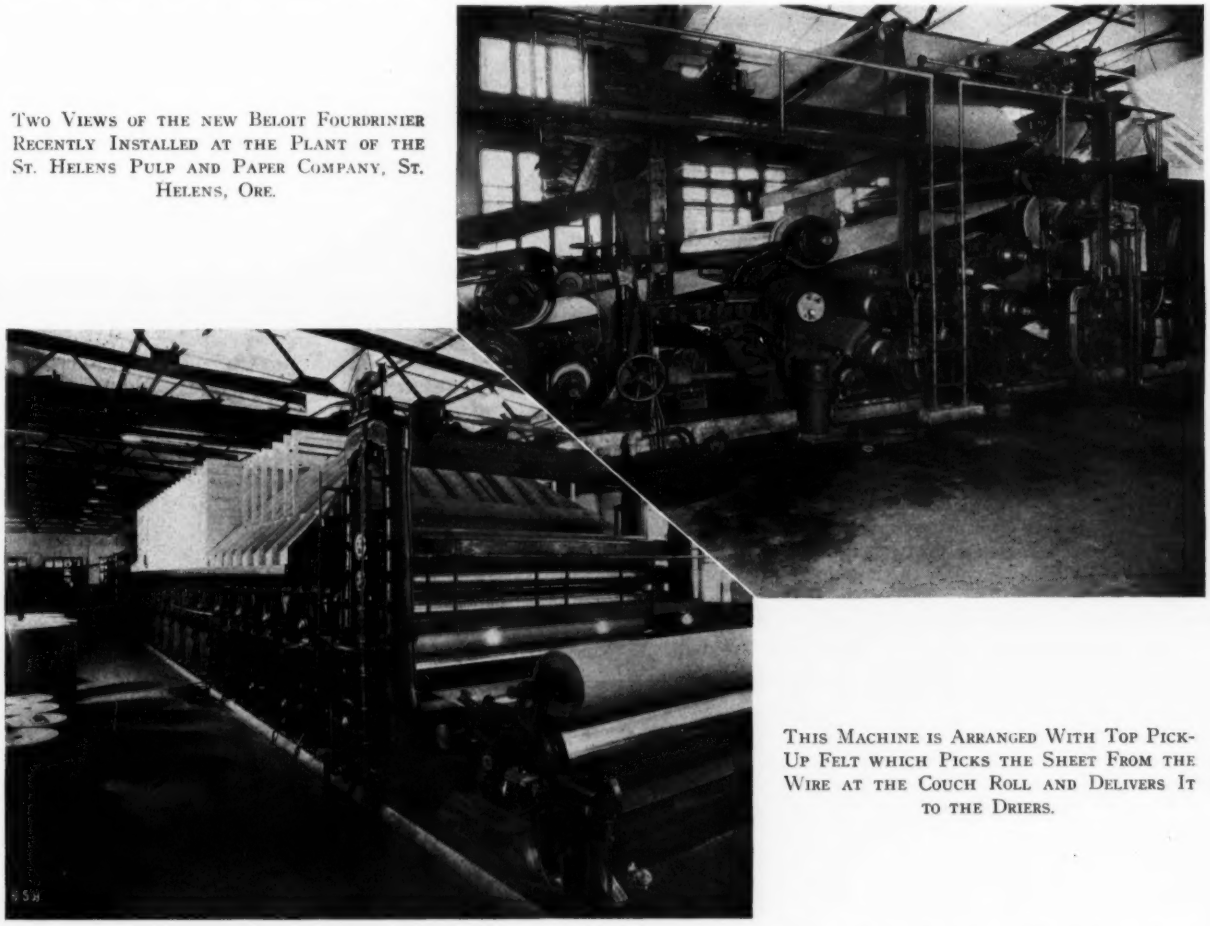
Machine No. 2, intended for light weight papers, was built by the Beloit Iron Works with a maximum speed of 1500 feet per minute, and has a trim of 192 inches. The Fourdrinier has all the very latest Beloit improvements and takes a wire 202 inches wide by seventy-five feet long.

This machine is arranged with a top pick-up felt, which picks the sheet from the wire at the couch roll and carries it through a suction first press, a plain second press, and over a transfer roll, which takes the sheet from the top felt and delivers it to the driers. The transfer roll is equipped with a creping device. The drier section consists of eighteen 60-inch driers with endless chain drive. The driers are mounted on anti-friction bearings, and the entire drier section and calender stack are oiled by means of a gravity oiling system.

The machine is driven by a 250 hp. Terry Turbine through a line shaft. From the line shaft each section is belted through Beloit spiral gears and Cutler-Hammer magnetic clutches. The constant speed shaft is driven by a 250 hp., G.E. synchronous motor.

This machine necessitated the installation of one additional digester, together with a set of four diffusers, an additional pulp screen and six additional Horne beaters and three Horne Jordans.

This machine gives the mill quite a flexible layout, inasmuch as it enables the production of weights in a range from ten pounds to two hundred pounds. The mill is equipped to bleach, which enables production of a very wide range of colors.



TWO VIEWS OF THE NEW BELOIT FOURDRINIER RECENTLY INSTALLED AT THE PLANT OF THE ST. HELENS PULP AND PAPER COMPANY, ST. HELENS, ORE.

THIS MACHINE IS ARRANGED WITH TOP PICK-UP FELT WHICH PICKS THE SHEET FROM THE WIRE AT THE COUCH ROLL AND DELIVERS IT TO THE DRIERS.

Panama City Kraft Mill In Active Operation

Largest Sulphate Pulp and Kraft Paper Mill In World Has Two Gigantic 234-Inch Fourdrinier Machines, With Speed of 1,200 Feet Per Minute—Combined Mill Capacity of Southern Kraft Corp. Reaches 375,000 Tons of Kraft Paper Per Year

THE latest mill of the Southern Kraft Corporation is now complete and in operation at Panama City, Florida. The site in the village of Bay Harbor, just on the outskirts of Panama City, is located on a peninsula with deep water on the two sides—St. Andrews Bay on the South, and Watson Bayou on the West. Ocean going vessels have for years called at this same site to take on lumber cargoes. For future water borne traffic accommodating in and out bound tonnage, not only that resulting from the Southern Kraft operation but affording accommodations for all other movements as well, a most modern dock has been provided.

This structure is 450 feet long, berthing facilities and railroad accommodations for ships on either side; fire proof warehousing, is designed for permanency, convenience, and rapid handling of freight either in loading or discharging. This dock unit is the first of a series of a complete docking system, additional units to be added as conditions warrant. Serving the dock and likewise the mill for rail movements is the Atlanta and St. Andrews Bay Railroad, with direct rail connections with the Louisville & Nashville Railroad at Cottondale fifty miles North and with the Atlantic Coast Line and Central of Georgia at Dothan, Alabama, eighty miles North of Panama City. An area of approximately 150 acres embraces all the mill buildings, docks, wood yards—in fact the entire operations.

The Panama City mill, details of which follow, is the largest sulphate pulp and kraft paper mill in the world. Designed for an initial capacity of 300 tons of finished product per day, the most modern and improved equipment was selected, all with the end in view of having all preliminary and auxiliary operations dovetail in and conform to a paper machine speed of 1200 feet per minute. A great portion of the equipment and apparatus, as well as the paper machines, required special development to meet this high machine speed.

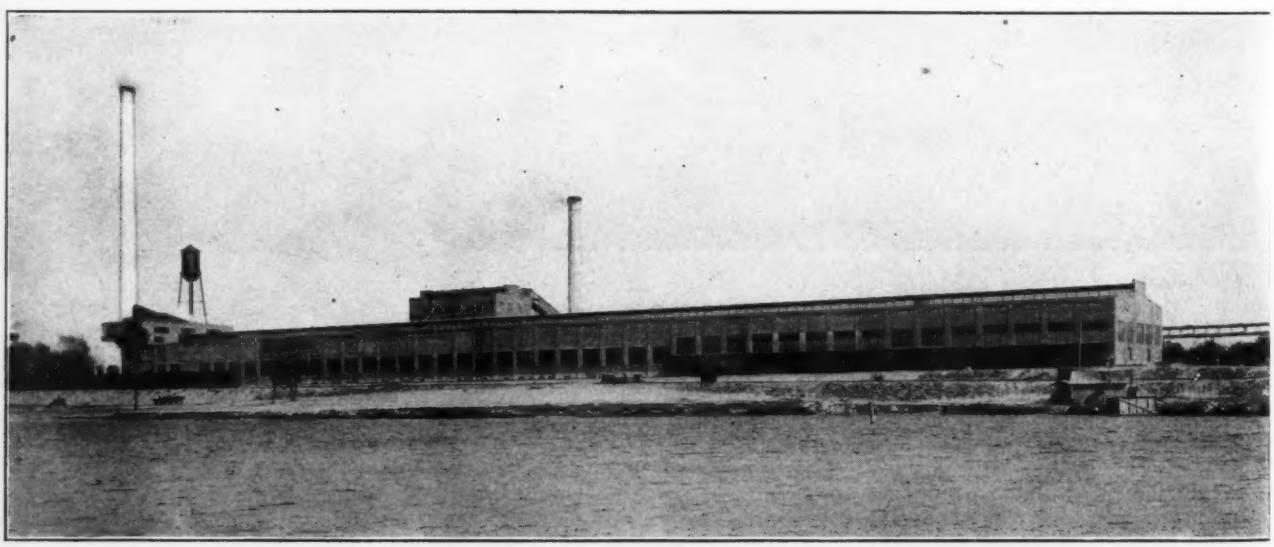
Two gigantic paper machines built by the Beloit Iron Works, each 234 inches, equipped with Terry silent chain drive, positive speed controls, each served with its own battery of ten of the largest Shartle-Miami Jordans obtainable, Dilts New Type Beaters and other auxiliaries in proportion, are under absolute automatic control. Control features and labor saving devices are in more evidence than ever before and function perfectly. Timken roller bearings are standard throughout. The entire scheme of operation is compact but affords ample provision for doubling the entire mill capacity at any time. This provision was constantly in mind during the period of design and as a result 300 additional tons of capacity can be added to the present unit without causing any inconvenience or one minute's lost time to the original unit.

Mill Location Ideal

The mill location is not only desirable from the standpoint of rail and water movements for in and out bound freight, but is fortunate in having its raw wood supply available within a stone's throw of the wood yard—timber tracts ranging from 75,000 acres to 500,000 acres are accessible within a radius of fifty miles. Preparations have been made to receive this pulpwood by rail, barge and truck. The wood yard, large enough to accommodate 100,000 cords, is amply provided with conveyors which can receive the billets direct from barge, railroad car or truck, and deliver direct to the barking drums. Portable conveyors are used for handling the billets from storage to the above mentioned conveyors.

All buildings are of reinforced concrete, brick and steel construction with gypsum roof decks covered with built up water proofing. Ample fire protection is provided.

The Wood Room Department including two 12 foot x



PANORAMIC VIEW OF THE PAPER AND PULP MILL.

45 foot barking drums, made by the Fibre Making Process, Inc., Chicago, two 96 inch chippers, manufactured by the D. J. Murray Manufacturing Company, with their complement of screens, installed by the W. S. Tyler Company, crushers, chip conveyor, etc., is compact and extremely well balanced and provides all that is necessary for continuous operation.

Pulp Mill Section

The Pulp Mill section, including chip storage, digesters, diffusers, evaporators, screens, deckers, wet machines, is housed under one roof. This building is three stories in height, affords ample room for operating, and is extremely well lighted and ventilated. Numerous innovations are evident and nothing pertaining to efficient and well balanced operation has been omitted. Truly it is the last word in pulp mill design.

The Caustic Plant, Chemical Storage, and Soda Recovery buildings are well grouped and here also latest methods and appliances have been introduced. Lime recovery, the production of steam by the utilization of waste heat, and wood refuse, continuous causticizing, equipment for which was provided by the Dorr Company, all make for an ideal set-up.

Machine Room, Beater Room, Jordan Room and Finishing Room are combined and provide straight line operation. Six mammoth beaters, twenty gigantic Jordans, and all necessary auxiliaries of proportionately large dimensions, serve two 234 inch high speed Fourdrinier kraft paper machines operating at 1200 feet of paper speed per minute. To handle this remarkable speed and the contemplated tonnage, labor saving devices entirely new have been brought into service.

Although the paper machines are almost identical, each having 90-foot wires, two suction presses, one straight pressure press roll and smoothing rolls, anti-friction bearings throughout, and silent chain drive, they differ in that one machine is equipped with 44—60-inch driers and one stack of calenders, eight rolls, while the other has 46—60-inch driers and two stacks of calenders, eight rolls each. Automatic lubrication is provided throughout the entire equipment of paper machines and Jordans.

Winders of each machine are Cameron double drum type with combined slitter attachment. Finished rolls are automatically removed from the winder and winder shaft is automatically withdrawn.

INTERIOR OF MACHINE ROOM.

Cranes and Monorails systems are available for all uses.

The Finishing Room is provided with two 72 inch Cameron rewinders, two 84-inch trimmers, one 222-inch heavy duty duplex cutter equipped with layboy and twelve back stands.

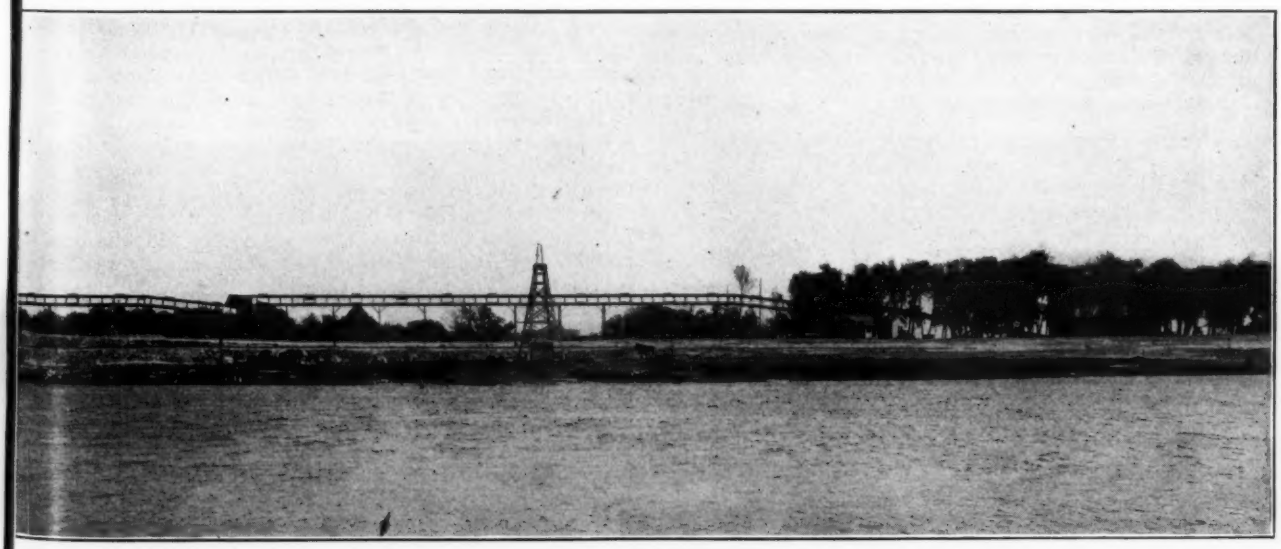
The Shipping Room is so arranged that the finished product can be delivered to cars on either side of the mill or moved directly to wharf for loading into steamers.

The Power Plant

In considering the design of the power plant for the Panama City Mill which was designed by the Rust Engineering Company in conjunction with the engineers of the Southern Kraft Corporation, four things were foremost in mind; utility, economy, appearance, and safety.

Under the heading of utility it was necessary, because of the isolated location of the plant, to design and lay out the equipment in such a manner that, in the event of break down of some essential part of the equipment, it would at no time shut down the entire manufacturing process.

Under the heading of economy it was necessary to prove that the plant could be built and operated more



MILL OF SOUTHERN KRAFT CORP., AT PANAMA CITY, FLA.

economically than it would be possible to buy steam and power from any other source.

Under appearance it was deemed advisable to so place the switchboard room and main power plants as to form a continuation of the paper machine building without breaking up the architectural lines of that building.

Under safety it is the policy of the company to do everything possible to enhance the safety of the operators throughout the entire plant. This applies not only to such things as safeguards around moving or revolving machines but also safeguards in the method of operation.

Careful study indicated that for the requirements of the plant manufacturing processes, which required steam at two pressures; namely, 150 pounds Gauge with 50 degrees Superheat, and 35 pounds Gauge, Saturated; that an initial pressure of about 425 pounds Gauge with 650 degrees total temperature on the boilers would produce the best and most economical results.

Auxiliary Steam Plant

In addition to the main power plant an auxiliary steam power plant also supplies process steam for manufacturing purposes; the high pressure plant and the auxiliary plant being tied together so as to balance as nearly as it is practical to do so.

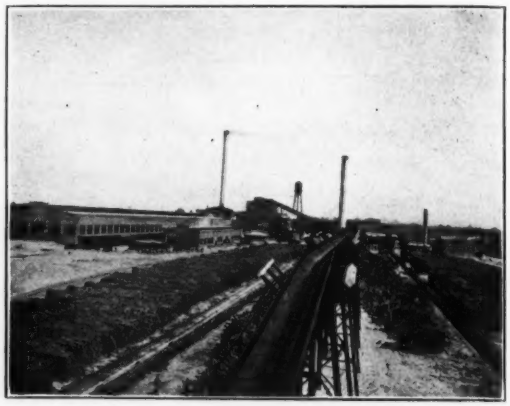
This auxiliary steam plant consists of ten, 5000 square foot, two-drum boilers of special design, built by the Erie City Iron Works, operating at 160 pounds Gauge Saturated and obtaining their heat from the black ash recovery furnaces and rotaries. In addition to these ten waste heat boilers, and immediately adjacent thereto in the recovery building, is a 605 hp, bark burning boiler of the Erie City, three-drum type, equipped with Foster-Wheeler superheater and operating at 160 pounds Gauge, 650 degrees total temperature.

The Dutch Oven of this bark burning boiler is divided into two sections, each of which is equipped with a National Stoker, manufactured by the M. A. Hofft Company, of Indianapolis. The Dutch Oven is divided into two sections to enable the operators to better control the fires and also permitting one section to be repaired while the fire is still maintained in the other section. The bark and sawdust is fed directly from a storage hopper into the Dutch Oven by means of a drag conveyor.

It is interesting to note that the high temperature steam from the bark burning boiler is mixed with saturated steam from the waste heat boilers and then passes on to the manufacturing process; most of this steam being used in the digesters.

Returning to the main power plant, we find on the 9375

BATTERY OF TWENTY JORDANS.



PULPWOOD YARD AND CONVEYOR.

KVA Westinghouse condensing unit, a non-automatic bleed point of 35 pounds pressure, so that additional steam can be supplied to process at this pressure if the load conditions on the other unit are insufficient to supply the demand. The 5000 KVA Westinghouse unit is designed for automatically bleeding or inducing at 150 pounds Gauge and 35 pounds back pressure. This unit acts as a balance wheel or throttle valve for the entire plant, the purpose being to generate as much power as possible with this unit, depending on the steam demands of the process plant. In addition to the above units there is also installed a 750 KW General Electric unit for operation on 150 pounds Gauge pressure, which is used only for Sunday loads or to carry sufficient load for lighting and repair work at such times as the manufacturing plant may not be in operation.

Automatic Desuperheater Stations

Provision has been made to take care of the steam requirements of the plant directly from the high pressure boilers in the event that either one of the two large generating units should be shut down for repairs. This is taken care of by two pressure reducing desuperheater stations, one reducing from 425 pounds gauge, 650 degrees total temperature to 150 pounds guage, 440 degrees total temperature, and the other reducing from 150 pounds gauge, to 440 degrees Fahrenheit to 35 pounds gauge, saturated. These two stations are fully automatic and are of sufficient size to take care of the full plant requirements.

An additional desuperheating station is installed at the bark burning boiler so that at such times when the plant is shut down for repairs or any other reason, the 750 KW unit can be run on the steam delivered directly from the bark burning boiler. This line also supplies steam to the turbine driven fire pump.

An interesting item in connection with the plant is the fact that seven deep wells have been driven for the purpose of supplying the plant with water for all except boiler feed and for this purpose two shallow wells with a separate reservoir and booster pump have been installed. This shallow well water is treated in a Cochrane Hot Process Softener and Filter and is heated in a Cochrane Deaerating Open Heater and supplies the ten waste heat boilers and the bark burning boiler.

The high pressure boilers use only returned condensate, which is collected in a surge tank in the basement of the boiler house and from there passes on through a deaerating open heater, operating on 35 pounds pressure, and thence to a closed heater operating at 150 pounds pressure, thus minimizing the difficulties usually encountered on high pressure boilers from impurities in feed water.

Abundant Water Supply

In addition to the feed water supplies, each group of boilers is piped up in such a way that four sources of water supply are available in case of emergency; namely, condensate, shallow well water, deep well water, and water from the fire system.

It is expected that of the ten waste heat boilers, eight will normally be in operation, which, in conjunction with the bark burning boiler, should supply all the steam used in the pulp mill. In the high pressure plants, it is expected that two boilers will normally be in operation at approximately 225 per cent of rating and that these will provide sufficient steam for all the paper mill requirements and at the same time generate enough power for requirements at both the pulp and paper mills.

Welfare and Safety

A complete First Aid Room is maintained, in connection with the mill, under the supervision of a trained nurse. This department is fully equipped with the most modern emergency hospital equipment—in fact to the extent that the doctor called in on an injury case has at his disposal everything necessary to properly take care of the injured employee.

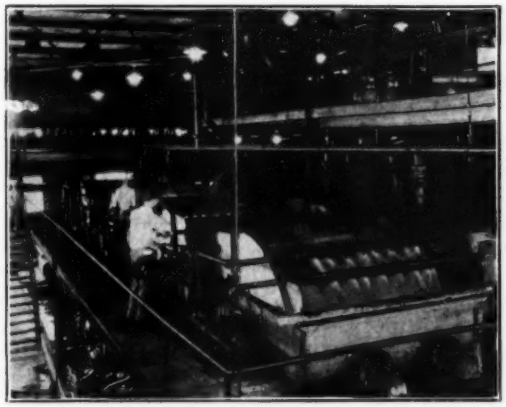
In addition to the First Aid Room the nurse spends considerable time each week in Community work among the families of employees, giving them advice on health matters, both verbally and through the medium of special pamphlets under the Metropolitan Group Insurance Plan.

Under the Group Insurance Plan each employee is entitled to insurance after six months service with the company, amount of insurance being based on salary of employee with a minimum amount of $1000 and a maximum of $5000. This is a three way policy paying face value for natural death, double indemnity for accidental death and with a weekly disability payment of $10.00 minimum and $20.00 maximum, with specific payments for certain permanent disabilities. The face value of the policies increases $100 per year for each year's service with the company up to five years.

The company pays one half of the premiums on the insurance, the employee paying the balance, with the exception that the cost of the $100 per year increase above mentioned is paid for by the company.

In connection with this plan is an organization known as Employees Mutual Benefit Association, formed by the policy holders and operated under a board elected by them for the purpose of promoting welfare and social good fellowship among the employees and their families. As an incentive to furthering the good work of this association, the company has inaugurated a scheme to aid financing the organization by turning over to the association each year the entire dividend declared by the Insurance company.

RECOVERY ROOM.



SCREEN ROOM.

In addition to the above there is a Safety Committee, consisting of several employees and the First Aid Nurse. This committee meets each week for the purpose of discussing accident prevention, studying causes of accidents and devising methods of eliminating them. Each of the six mills has such a committee. Complete records are kept and a comparison of the results obtained is sent to the chairman of each committee.

To create friendly competition in safety work a special Safety Flag is sent to the mill with the best safety record. This flag is flown by that mill under the American flag until one of the other mills earns the privilege of flying it by making a better safety record for one month, and the other mills are given percentage rating based on their standing in the safety race. The winner of the flag is congratulated and listed for the next month in first place. The mill retaining the Safety Flag for three consecutive months is listed thereafter as the "One Star Mill", until some other mill equals or betters the record, but is always maintained on the records as a "One Star Mill" for the period in which the star was won.

375,000 Tons of Kraft Yearly

With the Panama City mill in active operation, the Southern Kraft Corporation has a combined mill capacity of 375,000 tons of kraft paper per year. A portion of this tonnage is used by the company's own bag factories. These two units—modern, efficient, and high speed producers, have a capacity of 30,000,000 bags per day.

Watervliet Mill Adds New Coating Machine

Minor changes have been continually made by the Watervliet Paper Company, manufacturers of specialized coated papers, offset and plain book papers, of Watervliet, Mich., during the last two years, to improve the mechanical set-up of the plant.

The largest single item of equipment installed consisted of a 94 inch Arched Back Coating Machine. This machine is of the very latest type and is equipped with a Reflex Drying System. Minor changes have also been made in the balance of the coating equipment, the bleaching system, the book paper mill, etc.

New Paper Mill to be Established at Avery

Factory of Hoover Mfg. Co., Purchased by Avery Paper Corp., to be Reconstructed to Produce Art Paper—New Modern 100-Inch Paper Machine to be Installed—Output Will Include Construction, Poster and Drawing Papers, Etc.

AVERY Paper Corporation, a recently formed organization, has purchased the plant of the Hoover Manufacturing Company, makers of farm implements at Avery, Ohio, and will establish a paper mill there. Work on necessary alterations, repairs and improvements in the factory buildings is now under way and the corporation expects to be producing art paper shortly. The new industry will furnish considerable employment.

The plant at Avery is ideally suited to the needs of the new corporation. The two main buildings, of brick and steel, are each two stories high. The main building is 45 by 500 feet, the other building is 55 by 165 feet. There is also a good power plant, with boilers, and two engines connected with Westinghouse generators. The plant has a good water supply and is on the main line of the Nickel Plate Railroad.

The company will install a modern 100 inch paper machine. This machine will be between 135 and 140 feet long and will provide the plant with a capacity of 15,000,000 pounds of paper a year. The company will begin with the manufacture of forty different colors of art paper as its principal product. Construction, poster, drawing papers and high grade manilla will be the starting output but the company will develop other school paper products. The company will also manufacture various ground wood and sulphite specialties.

Practically the entire main building will be utilized from the start of operations. It will be necessary to take out 140 feet of flooring for the installation of steel work and machinery, and work on this will be first undertaken.

The officers of the new company are as follows: James T. Begg, Cleveland, Ohio, chairman of board of directors; C. L. Hoag, Sandusky, Ohio, president and general manager; Joseph H. Salisbury, Sandusky, Ohio, vice president and chief engineer; and M. L. Rankin, Sandusky, Ohio, secretary and treasurer. In addition to the aforesaid, W. S. Babcock, Columbus, Ohio; C. W. Knouff, Sandusky, Ohio; and L. P. Spore, Sandusky, Ohio are also members of the board of directors.

Former Congressman James T. Begg is financially interested in the corporation and is enthusiastic over the prospects of the industry.

C. L. Hoag, a paper machine expert for more than twenty years, has had wide experience both in the installation of that kind of machinery and in paper manufacture. He was brought to Sandusky by W. H. Millspaugh to take charge of the model paper mill erected by the Paper and Textile Machinery Company.

M. L. Rankin, who has been a Sandusky resident since 1918, was also formerly associated with the Paper and Textile Machinery Company and was assistant to Mr. Hoag in the experimental work at the model paper mill.

Joseph H. Salisbury is chief engineer of the Paper and Textile Machinery Company and has much experience in paper machinery manufacture, installation and in paper manufacture.

W. S. Babcock has been identified with the paper industry for many years and is considered one of the best patent attorneys in the country. He is acting as counsel for the new company.

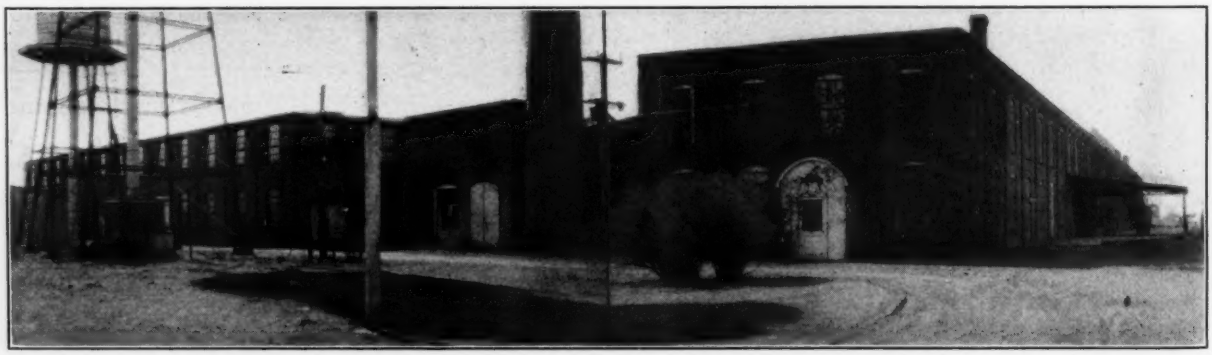
C. W. Knouff is manager of the educational department of the American Crayon Company, and L. P. Spore is auditor and office manager of the American Crayon Company.

Tennessee Paper Mill New Steam Unit Starts

Tennessee Paper Mills' new steam generating unit, which is one of the most modern in the South, has been placed in operation. The boiler plant was fired up Monday, September 14, when a breakdown occurred at the old steam plant. The new unit was installed at a total cost of more than $100,000.

All equipment was manufactured and installed by the International Combustion Engineering Company, the boiler being made in Chattanooga by the Hedges-Walsh-Weidner Boiler Company, International subsidiary. The boiler is of the high-pressure type perfected by the local concern. It operates on 200 pounds steam pressure and is rated at 1,000 hp., although it actually has a capacity of 3,500 hp.

Fire walls are water-cooled. Pulverized coal is employed as fuel. The boiler and equipment represents the very last word in engineering design and the unit is of the most efficient type. It will be used regularly to furnish steam for power and in the paper-making process at the plant. The old boiler unit will be retained as a stand-by to use in case of emergency and while the new steam unit is being cleaned or repaired.



PLANT OF THE AVERY PAPER CORP. OF AVERY, OHIO.

Inland Empire Paper Co. Builds Warehouse

Important Improvements Completed At Millwood, Wash., For Purpose of Modernizing the Plant Without Immediately Increasing Production — Betterments Supply More Room and Afford Improved and More Direct Methods for Handling Stock in Process

A RATHER extensive program of improvements was initiated the latter part of last year at the news print mill of the Inland Empire Paper Company in Millwood, located six miles east of Spokane, Wash. The improvements consisted principally of the building of a new warehouse, equipped with all the modern improvements, but included also the extensive modernization of the grinder room, the complete rebuilding of the wood room and the construction of a log pond into which the logs may be dumped as they come direct from the camp.

All of this work was done without any interference with the operation of the mill nor were there any difficulties in immediately making use of the new structures as rapidly as they were completed.

Improvements Visualized

Numerous illustrations are presented herewith which visualize the story of the improvements.

Figs. 1 and 2 show the addition to the finishing room and warehouse space.

Fig. 3 shows the interior of the main floor of the new building with sheet cutters and trimmers being installed.

Fig. 4 shows a part of the second floor of the building.

The Train Shed

Fig. 5 shows the interior of the train shed looking west which, obviously, is formed by a monitor between the old (right) and the new (left) buildings. It will be noted that electrically operated drawbridges connect the old and new buildings across the tracks. The roll storage portion of the new building is shown on the second floor at the left. Rolls are handled into storage by means of a hydro-electric roll elevator which raises the roll, dumps it automatically onto a dolly operated on rails at the proper elevation for respective tiers after which the elevator automatically returns to the main floor. Rolls are handled out of storage by means of a chute and a tilting table at the end thereof which up-ends the roll for loading into the railway cars.

The east end of the new building houses on the main floor the machine shop and on the second floor the carpenter shop. On the north side of the train shed at the east end a portion of the old building has been torn away to permit the construction, as a part of this building, of a new mill supply department occupying two floors and a new roll grinding room conveniently located near the machine room. The east elevation of the building, therefore, is practically a counterpart of the west elevation.

Fig. 6 shows the train shed looking from west to east.

The New Log Pond

Fig. 7 shows the new log pond with the rebuilt wood room in the center background and the new grinder room in the right background.

FIG. 1. NEW FINISHING ROOM AND WAREHOUSE.

FIG. 2.

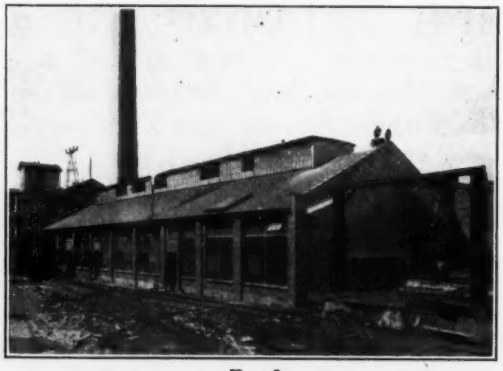


FIG. 8.

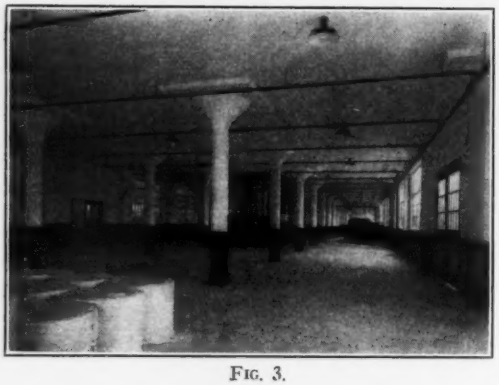


FIG. 3.

FIG. 9.

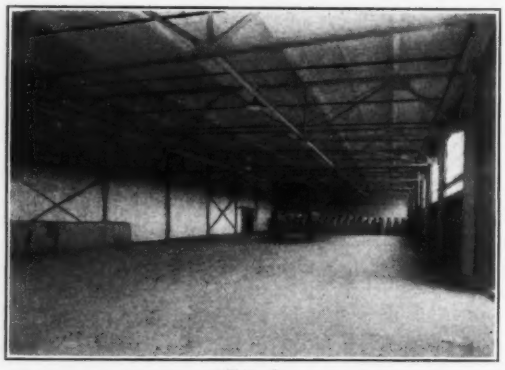


FIG. 4.

FIG. 10.

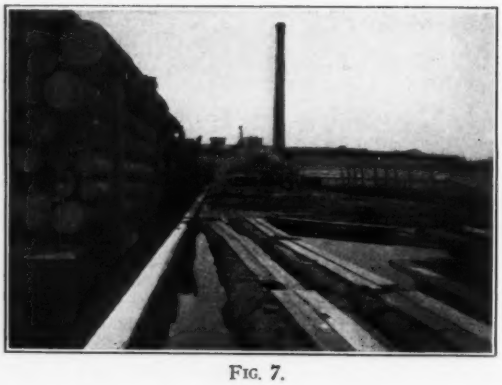


FIG. 7.

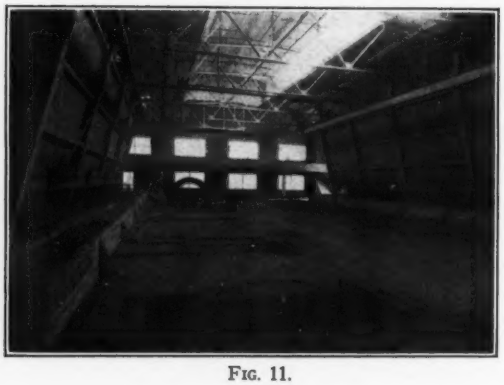


FIG. 11.

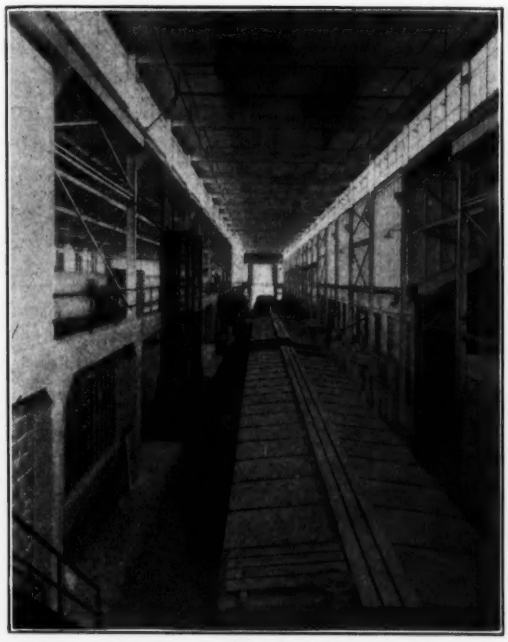


FIG. 5

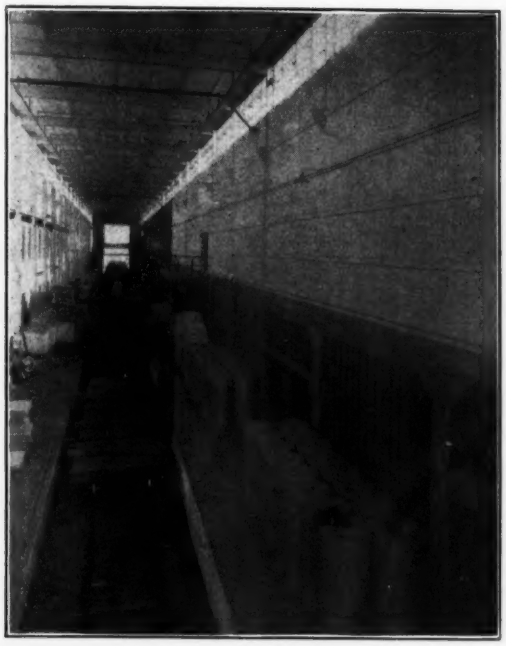


FIG. 6

Fig. 8 shows the exterior of the rebuilt wood room.

Fig. 9 shows the interior of the rebuilt wood room with the relocation of machinery still incomplete.

Fig. 10 is an exterior view of the new grinder room from the northeast.

Fig. 11 shows the interior of the new grinder room with the steel hopper bins at the sides for holding the pulpwood blocks.

Production Doubled Since 1920

The purpose of all this construction or revamping, therefore, was obviously for modernizing the plant without immediately increasing production. Since 1920 the production has been practically doubled without any increase in many of the departments contributing to the paper machines or taking care of the production from them. There was not only the need, therefore, for more room but for better and more direct methods in handling the stock in process.

The engineers and builders were the Austin Company of Cleveland, Ohio.

Officers of the Company

The officers of the Inland Empire Paper Company are —Judson G. Rosebush, president; L. M. Alexander, vice president; W. A. Brazeau, secretary; W. E. Rosebush, treasurer and general manager; George W. Brown, superintendent; Horace Banta, superintendent of Sulphite Mills and F. W. Aucutt, power engineer.

Boston Chapter of Waste Institute Formed

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 22, 1931—A Boston Chapter of the Waste Paper Institute, a national body affiliated with the National Association of Waste Material Dealers, was formed at a luncheon meeting of the waste paper dealers of New England at the Hotel Statler, this city, October 13. The following officers were elected: Chairman, Robert F. Graham, of P. H. Graham & Sons Company, Boston; vice chairman, Ben Gold, of the North Shore Waste Paper Company, Salem, Mass.; secretary-treasurer, William H. Brown, of D. DeStefano Company. Directors, George M. Graves, Richard G. Graham, of the J. J. Graham Paper Company, and Harry Shuman, of the Braver Healey Company.

Charles M. Haskins, secretary of the National Association, discussed the aim of the Institute. It purposes to take part aggressively in the improvement of conditions within the waste paper trade and those between packers and manufacturers. Through conferences with the Paper Board Industries Association the Institute has already taken steps to improve relations with the paper board mills. Many trade problems, including the subject of a standard packing for A grade or No. 1 quality waste paper, were discussed. Greetings from Newell J. Lewis, head of the Institute, to the Boston men, were read.

The Boston chapter of the Institute is the second to be established. The first was formed in New York. It is expected that there will be chapters in Buffalo, Chicago, Philadelphia and other centers. Arrangements for monthly meetings of the Boston chapter are to be made.

Those present at the meeting Thursday, besides the officers previously mentioned, included James J. Materson, of Pawtucket, R. I.; Morris Driscoll, M. F. Driscoll Company, Boston; representatives of Rosh Waste Paper Company, Worcester; A. Bazar & Son, Providence; Lawrence Waste Paper Company; Harold B. Wilder, of True & McClelland; Charles McKenna and Ben Alper, of M. S. Alper & Sons; Carl Graham, of J. J. Graham Paper Company; Samuel Hershman, of I. Hershman & Company, New Haven, Conn.; and John Z. Gobell, of Gobell Paper Stock Company.

Boston Chapter of Waste Institute Formed

Pacific Coast Paper Mills, of Bellingham, Wash., have made several installations during the past year. Beating capacity and speed of machines have been increased. Additional towel folding equipment has been installed, and approximately a car load of towels can now be turned out daily. Inter-folding toilet paper machines, single and double fold, have also been added.

Blandin Paper Co. Builds Unique Paper Mill

Unusual Design and Construction of New Mill At Grand Rapids, Mich., Allows Complete Control of Ventilation, Lighting and Temperature—Modern Type 156-Inch Fourdrinier Capable of Speed of 1,500 Feet of Paper Per Minute

WHAT is believed to be the first paper mill in the world deliberately designed without windows has been constructed at Grand Rapids, Mich., as an addition to the Blandin Paper Company's plant and began operations recently. The mill is located on the Mississippi River just below the great storage basins of Lakes Pokegama, Leech and Winnibigoshish and is the first to be served by water power from these reservoirs.

Experts declare that this type of construction is particularly adapted to a paper mill in this location. Twenty-four hour operation of the mill and many hours of darkness during the year necessitates adequate artificial lighting regardless of windows. In this plant fresh air is admitted to every department and passes through the mill to the centrally located exhaust system in the paper machine room. It is controlled in quantity and temperature to provide comfort regardless of weather.

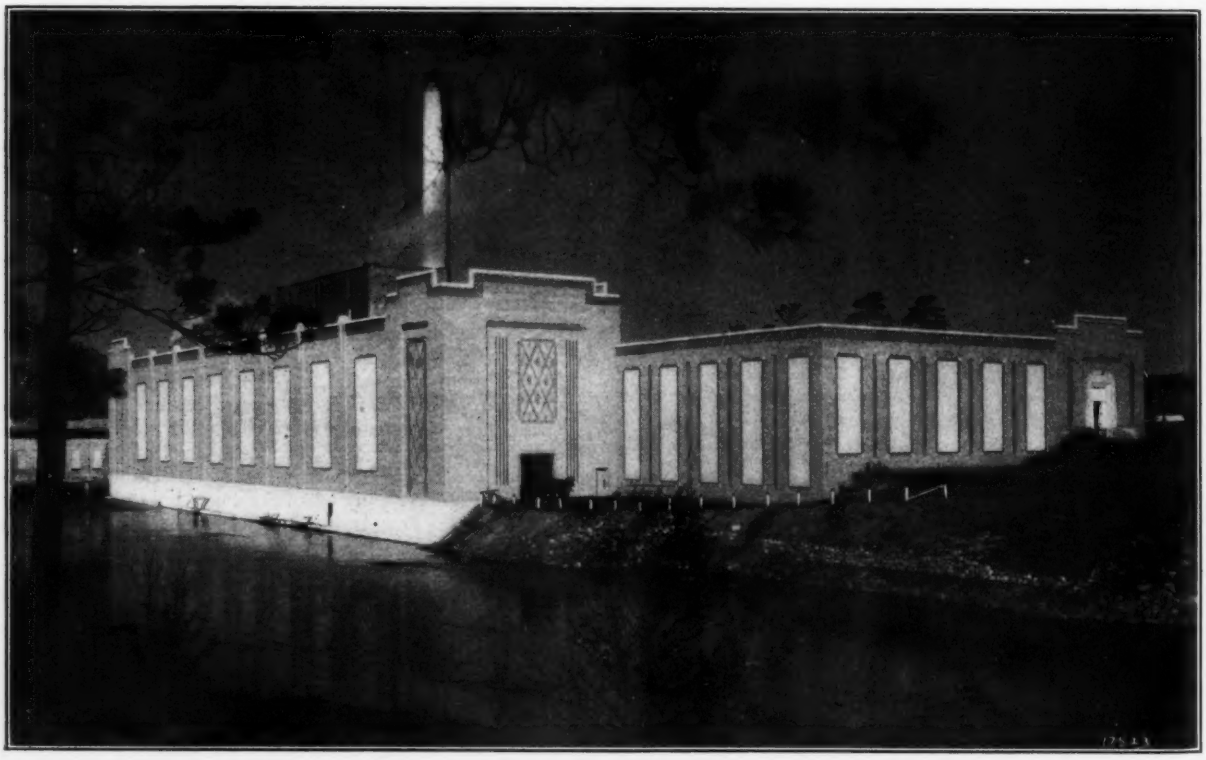
New Beloit Machine Installed

Beloit Iron Works built the new machine installed in this mill, which is of the latest and most modern type and embodies many improvements not heretofore used on news print machines. It is capable of operating at a speed of 1,500 feet of paper per minute. The wire part is for a wire 156 inches wide by 100 feet long and is of the latest removable type arranged with Aldrich High Speed Universal Super-Shake. The shake is driven by means of a variable speed motor and arranged so that the speed and stroke can be adjusted while the machine is in operation. The shake gives a range of stroke from 200 to 700 per minute.

The Fourdrinier part can be removed by motor power as a unit when changing wires and is designed for utmost convenience and saving in time for this operation which is facilitated to a large extent by Beloit improved type of wire carriage for forming the wire in a loop preparatory to the operation of changing a wire. With this device, the wire is guided quickly over the cantilever type of suction couch roll, which is also of the Beloit type, then quickly strung lengthwise of the machine and arranged in a loop from aluminum wire poles suspended from overhead electric hoist.

Many Unique Features

Another feature of the Fourdrinier part which is worthy of mention is the new method for handling the breast roll when changing wires. By means of a back geared device, the breast roll is quickly lowered from its operating position to give room for running the Fourdrinier part inside the wire loop. This operation is accomplished without handling any of the table rolls or any part of the savealls which has heretofore been necessary. The Fourdrinier part is arranged with polished steel savealls the full length



MACHINE AND FINISHING ROOMS, SHOWING WINDOWLESS APPEARANCE OF BUILDING

of the forming surface and stainless steel crumb catchers beneath the suction boxes. Sandusky showers are used, also Nash vacuum pump and Hayton fan pumps.

The Fourdrinier has six suction flat boxes arranged with Beloit improved hydraulic type oscillating equipment, which keeps the boxes moving under the wire continually, preventing ridges in covers and simplifying the operation of guiding the wire. Another interesting feature in connection with the suction flat boxes is the new method devised for separating the air and water individually from each suction flat box. This improved device permits finer regulation of vacuum on the flat boxes and prevents what is termed as slugs—which on the ordinary arrangement sometimes stops the wire and causes marks in the sheet.

Efficient Suction Couch Roll

The Beloit suction couch roll is 36 inches in diameter, arranged with direct drive and improved device for supporting packing in connection with the suction box on inside of roll. This arrangement is such that the packing is adjusted evenly to the shell the entire length and operates with a very slight pressure, insuring long life to shell and packing and operating with a minimum amount of power. The amount of power saved with this type of roll is considerable. Another point worthy of mention is that regardless of vacuum carried the power required to drive the roll does not change to any noticeable extent. All rolls on Fourdrinier part are fully equipped with anti-friction bearings.

Beloit Type Suction Presses

This machine has two suction presses of the Beloit type, top rolls of Stonite composition, arranged with Micarta doctor blades and automatic motor driven brake conveyors. The suction press rolls are also arranged for direct drive and fully equipped with anti-friction bearings and improved packing supporting arrangement, similar to suction couch roll.

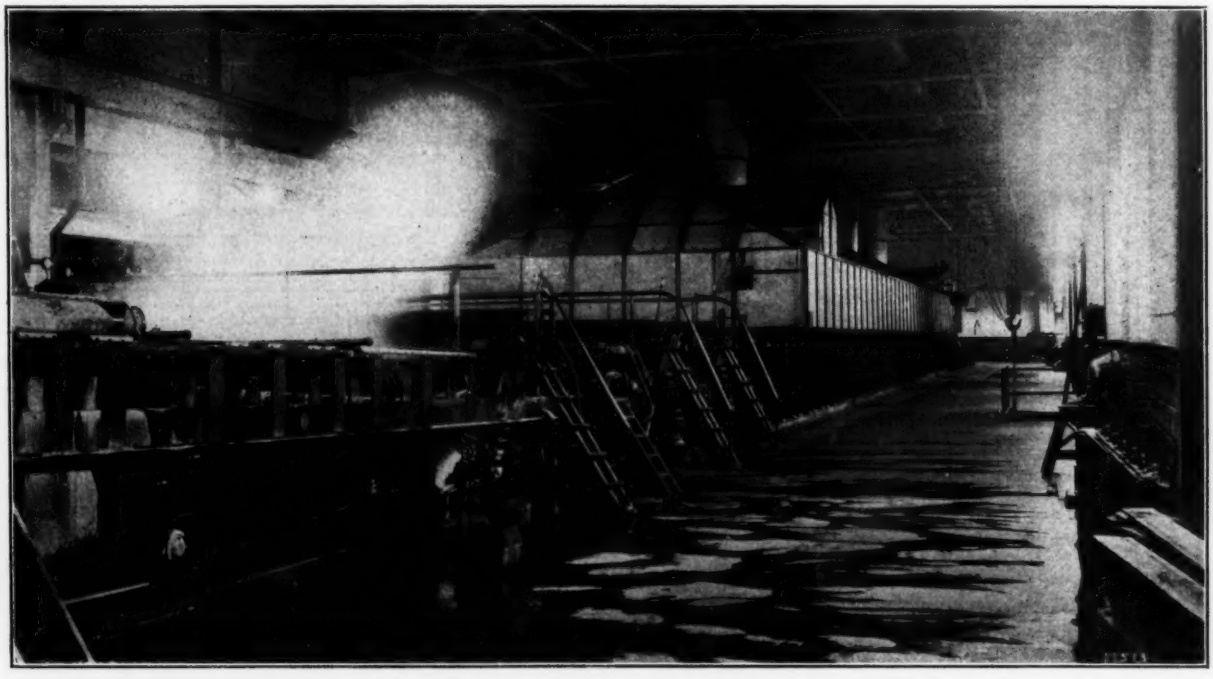
NEW MACHINE FROM ROLL END LOOKING TOWARDS DRIER ARRANGEMENT.

The felt tighteners for the two presses are located in the basement and operated by means of motors, controlled by push buttons upstairs. All felt rolls and press rolls in press section are fully equipped with anti-friction bearings.

In addition to the two suction presses before mentioned, this machine is equipped with an improved type of smoothing press which is located at the beginning of the drier section.

Driers Perfectly Arranged

The drier part is arranged with forty-eight 60-inch driers in two deck, also four 48-inch felt driers are used. All of the driers and felt rolls are mounted in anti-friction bearings. The driers are driven by means of a silent chain which runs on small cut steel sprockets in the same manner that the paper goes around the drier. This arrangement insures perfect regulation on draws between driers, eliminates vibration heretofore experienced with



NEW FOURDRINIER LOOKING FORWARD FROM THE WET END.

gears at high speed and permits easy access to the rear side of the machine as the chain and sprockets are totally enclosed, running in oil, and the housing surrounding the chain and sprocket is made small and of such a design that the operator can easily inspect the bearings on the rear side of the machine while in motion. Furthermore, the patented chain drive gives better circulation of air on the back side of the driers which also contributes to increased efficiency in drying of paper.

Continuous Oil Circulation System

All of the drier bearings are lubricated by means of a continuous oil circulating system, the oil flowing by gravity from an overhead tank to the bearings, then overflowing into filters in the basement and circulated by motor driven pump. The felts are automatically tightened by improved device.

The steam joints are of the Beloit patented oilless, frictionless type which do not require any lubrication whatever and automatically compensate for any variation in steam pressure and operate with a minimum amount of power. The driers on this machine are arranged with Sheahan type rope feed for passing paper around the driers.

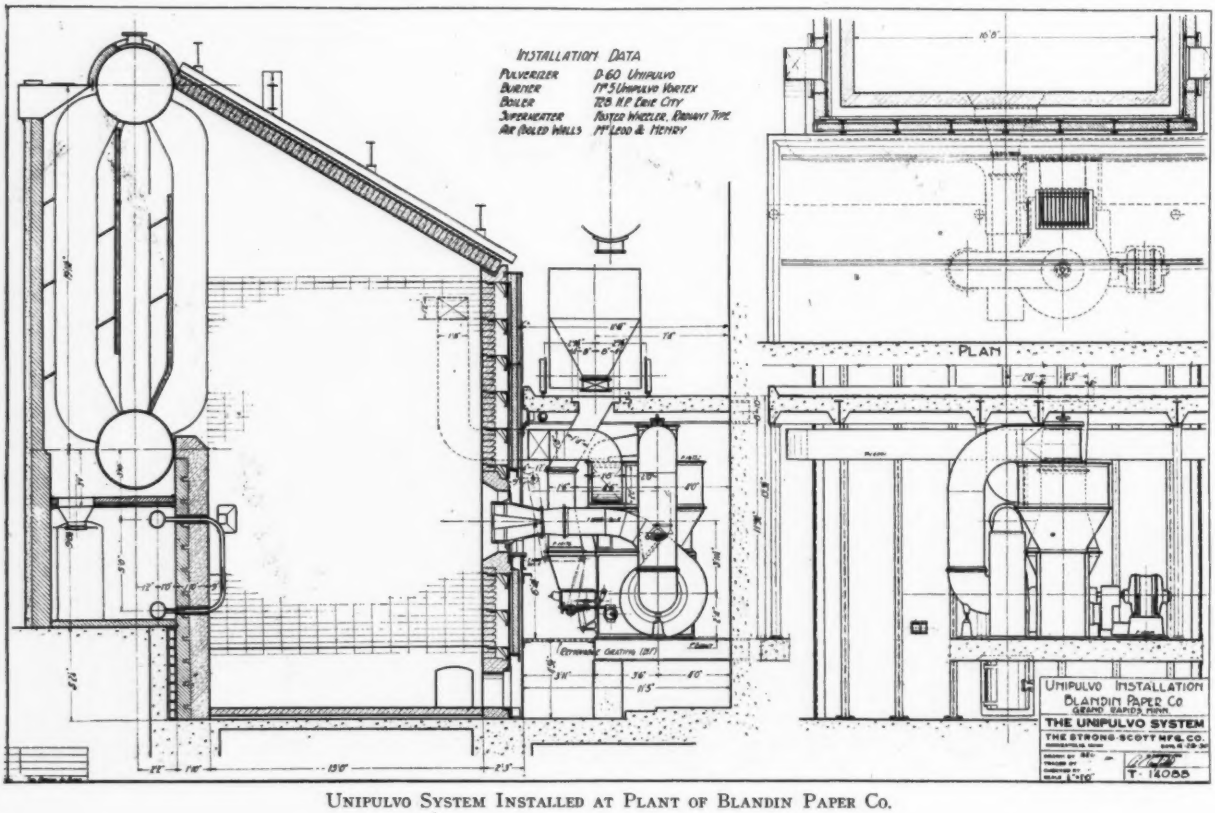
One eight-roll stack of calenders of Beloit's latest improved type is used, equipped with motor operated lift for raising or lowering rolls as desired. All calender rolls are equipped with Warren improved type of doctors.

Reel is of the Aldrich type, which is conceded to be most efficient for this type of machine, arranged so that the operator can unload the finished roll of paper from the reel by means of a motor operated device and also arranged so that the paper can be transferred from the winding roll to a new spool without any loss of paper.

SECTION OF FINISHING ROOM SHOWING ARTIFICIAL LIGHTING EFFECT.

Beloit patented unloading type winder is arranged with steel drums, mounted in anti-friction bearings. Slitter is driven by individual motors and arranged so that the slitters can be engaged or disengaged quickly by an improved device. The winder is driven by individual motors on each drum. These motors are compound wound so that the power imput becomes compensated as the roll of paper increases in size, giving an even density winding of the roll throughout. The winder operates at a surface speed of 3,000 feet per minute.

The unloading arrangement is such that the operator simply has to move the lever which controls a compressed air device which in turn automatically pushes the roll of paper off the winding drums to a set of arms which in



UNIPULVO SYSTEM INSTALLED AT PLANT OF BLANDIN PAPER CO.

turn lower the finished roll of paper to floor or truck as desired without the use of overhead hoist. With this arrangement one man can withdraw the shaft from the roll of paper and return it to the arms used for lowering the paper from the drum and by reversing the unloading device the winding shaft is returned to the bearings automatically. The unwinding stands used in connection with the winder are arranged with a water cooled tension device and air brake control for quickly stopping the unwinding spool at the same time the winder is stopped.

Boiler Plant Installation

The boiler plant is equipped with four boilers—one 728 hp. Vertical Erie City boiler equipped with a 7,000 lb. capacity Unipulvo unit pulverizer, one 823 hp. Stirling boiler, equipped with one 7,000 lb. capacity Unipulvo unit pulverizer, and two 300 hp. Oil City units, each equipped with one 2,000 lb. Unipulvo pulverizer.

Total installed pulverizer capacity is 18,000 lbs. of coal per hour. The two smaller boilers were equipped with pulverizers approximately one year after the larger units were installed. The operating efficiency will average approximately 80 per cent throughout the period of a month. Coal from the Great Lakes docks at Duluth is used.

The accompanying illustration shows the application of the pulverizer to the Erie City Vertical boiler. Operation on all units will average between 200 and 250 per cent of rating. In every case the installation of the pulverizers was a conversion job from stoker-fired units, with the one exception of the Erie City boiler. In this unit the Unipulvo pulverizer replaced another make of pulverizer installed several years ago.

Paper Makers Chemical Corp. to Expand

[FROM OUR REGULAR CORRESPONDENT]

RENSSELAER, N. Y., October 24, 1931—A program of expansion is expected at the local branch of the Paper Makers Chemical Corporation, following announcement this week that an alliance had been formed with the Hercules Powder Company, of Wilmington, Del. The chemical concern maintains its principal establishment in Kalamazoo, Mich., and controls numerous branches in this country. It was said that it would continue to operate under its own name as will its subsidiaries, the Paper Makers Chemical Company, Ltd., of Erith, Eng., and the Vera Chemical Company of Canada, Ltd., at Freeman, Ont. The Hercules Powder Company is recognized as one of the leading chemical organizations in the world and among its principal products are cellulose products, naval stores, explosives and chemical cotton.

The local plant of the chemical concern produces rosin size for waterproofing paper besides carrying in stock numerous products manufactured by the Hercules firm. Under the alliance the lines are to be extended in order to supply jobbers in this section with practically all products containing the Hercules brand. It was also announced that William Robertson will continue as resident manager of the local branch and it is probable that an enlargement of the working force will be made. It is understood that expansion plans being considered here will await a visit of officials connected with the Hercules concern that will take place within the next few weeks.

It was announced at the Carthage branch of the Paper Makers Chemical Corporation that no changes would take place in the management or personnel of the business. Officials of the company said that there will be no curtailment of operations and the new connections are expected to provide increased business.

Progress of A.P.W. Paper Co.

N. Clark Clement, president of the A. P. W. Paper Company, manufacturers of paper towels, toilet tissues, and other hygienic paper products, of Albany, N. Y., when presenting the annual report of the company to the stockholders recently, made the following statement:

"Your company has now completed the first full fiscal year under the new management which assumed control in May, 1930, and your president is glad to be able to report, despite the severe business depression, a marked improvement in the condition of the company as compared with a year ago.

"When the present management took control of your company, it was listing for sale over 700 different items and endeavoring to compete with other companies, one of which is doing a larger business but selling only six products. Concentrating on a few lines would enable us to manufacture at a very low cost with two large machines. Hence, the number of items has been systematically reduced each month and on June 30 of this year numbered only 120.

"During the past year we have employed an experienced and well-known paper chemist, who devotes his entire time not only to analyzing our products to keep them up to standard, but through research in connection with the manufacturing both of the pulp and the paper, is constantly endeavoring to improve our paper towels and toilet tissues.

"Along with improving the quality, we also are constantly seeking to reduce the cost of manufacture. Distinct improvement has been made during the past year in this regard. This has enabled us to reduce prices of our products. It is our determination that our distributors shall be able to sell products of the highest quality at the lowest prices."

Dr. Herty Approves Paper Machine

SAVANNAH, Ga., October 24, 1931—Specifications for the paper making machine to be used in the research laboratory to be established in Savannah for the manufacture of paper from Georgia pine pulp have been approved by Dr. Charles Herty, consultant of the Savannah industrial commission.

Dr. Herty spent the past week in Savannah looking after arrangements in connection with the opening of the research laboratory at West Broad and Bay streets, on the site loaned to the industrial committee by the Savannah Electric and Power Company. He anticipates that it will be well along in January before the plant is placed in operation.

In addition to the paper machine itself, there is a considerable amount of other equipment to be furnished by the Chemical Foundation, Inc., of New York, which will require some additional study before the specifications are finally approved.

R. B. Robertson Heads Champion Fibre Co.

In the issue of the PAPER TRADE JOURNAL of October 15, in announcing the election of Alexander Thomson as president of the Champion Coated Paper Company, of Hamilton, Ohio, it was erroneously stated that Mr. Thomson had also been elected president of the Champion Fibre Company of Canton, N. C., to succeed his late father. This error is regretted as Rueben B. Robertson has been and continues president of the Champion Fibre Company. Mr. Thomson was elected chairman of the board of the Champion Fibre Company.

Completing $2,000,000 Program at Thorold

Ontario Paper Co.'s Ambitious Program of Improvements, Started Early Last Year, Practically Finished—Readjustments, Additions and Major Mechanical and Physical Changes Effected In Every Department of News Print Paper Plant

ONTARIO Paper Company, Thorold, Ont. is nearing the completion of a $2,000,000 program of improvements started in the early part of 1930 which embraced readjustments, additions and major mechanical and physical changes in every department of the plant. At that time the new management, consisting of A. A. Schmon, vice-president and general manager; D. L. McLeod, mill manager; and John A. Devine, general superintendent, assumed control and were faced with a new order of things. The business depression had begun to make itself seriously felt after a fifteen year period of unprecedented prosperity in the paper industry.

The management appreciated that it was a case where it was absolutely necessary that every factor which contributes to successful and profitable operation must be thoroughly analyzed and that it would require a great deal of executive intelligence to direct the course of the future operations in order to survive, therefore, this program of improvements was inaugurated after a great deal of planning and careful consideration with a definite purpose in mind, first, of improving the quality of product, second, eliminating waste and increasing efficiency in order that a super quality news print could be produced at the lowest possible cost.

New Paper Handling System

It was discovered after careful analysis that coal, which was being transported by rail from the mines in Pennsylvania to Thorold, could be shipped to Buffalo via rail, dumped into bulk freighters there and transported to Thorold via the Welland Canal at a saving over the all rail transportation of $1.00 per ton, after all carrying charges on new investment in necessary unloading cranes, conveyors, storage charges etc.

At about the same time the new paper handling system was inaugurated for transporting paper by the all water method. After much careful research and investigation by the company's engineers, a system of handling paper from finishing room to storage and from storage to boats was devised which is now recognized as most efficient.

The motorship *Thorold*, which was especially designed by the company's engineers for carrying paper, is used to transport the paper from Thorold to Chicago. She has a capacity of 3,500 tons and handles all of the paper, amounting to 75,000 tons during the navigation season.

PHOTO SHOWING NEW COARSE SCREEN INSTALLATION FOR GROUND WOOD TAILINGS.

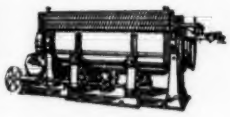
The tremendous savings made in transportation costs by these investments were constantly being plowed back into improvements for better quality of paper and increased economies of operation. A new chemical laboratory was built and a department of technical control and research was inaugurated under the supervision of L. C. Anderson.

Wood Preparation System Revised

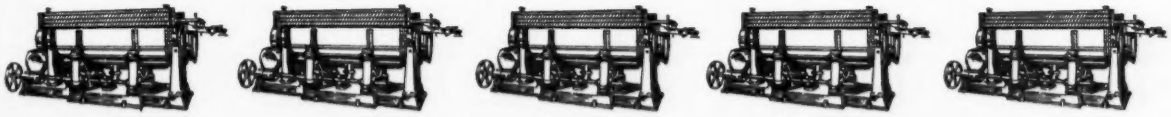
The first step in quality improvement was the complete

PHOTO SHOWING NEW 5,000-TON STORAGE SHED WHERE NEWS PRINT ROLLS ARE STORED FOR SHIPMENT BY BOAT TO CHICAGO.

PHOTO SHOWING NEW ROSS VENTILATING SYSTEM WITH NEW HOODS ON NOS. 1 AND 2 MACHINES, EACH 204 INCHES WIDE.



Ten mills invest $132,800 in BIRD SCREENS

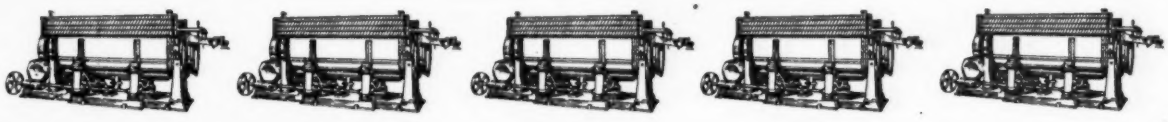


When ten mills alone, in the space of eight months, install that many Bird Screens there's only one conclusion: the Bird Screen is *essential* for the quantity production of high-quality stock at low cost.

BIRD MACHINERY

Write; let us show you what Bird Screens would mean in your mill.

BIRD MACHINE COMPANY
South Walpole - - - Massachusetts



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revision of the wood preparation system so that all wood coming into the plant is thoroughly washed and made free from dirt, bark and stripped of all knots and when the wood reaches the grinders and chippers it is as clean as it is possible to make it. The next step was the complete revamping of the screening, deckering and white water system at a cost of $100,000 to insure a cleaner and better quality stock to be delivered to the paper machines.

Other important steps in the quality program were the installation of a complete new fresh water system to insure sufficient supply of clean, fresh water which gives a sheet of paper of superior color and more uniform in quality. The installation of suction couch and press rolls on all of the five machines to give a superior formed and finished sheet of paper, also increases the uniformity of drying, which is very important in manufacturing a high quality sheet of news print at high speeds.

New Liquor Recovery Process

An investment of about $100,000 in the sulphite mill in a new liquor recovery process which gives a much whiter and stronger grade of sulphite pulp, also effected extensive economies in sulphur and steam consumption.

In addition to the very great gains in quality made by these improvements there also resulted many economies, such as the elimination of white water losses, rearrangement of pipe lines and pumps which reduced power consumption, rearrangement and modernization of equipment with the resultant saving in labor.

Economizer System Installed

Other installations that have been made in the program of improvement over the past eighteen months, are the new Ross ventilation and economizer system in the machine room, two new continuous broke beaters to handle all the broke from the five machines, with a great saving in man power, new machine shop, electrical building and new time and pay roll office.

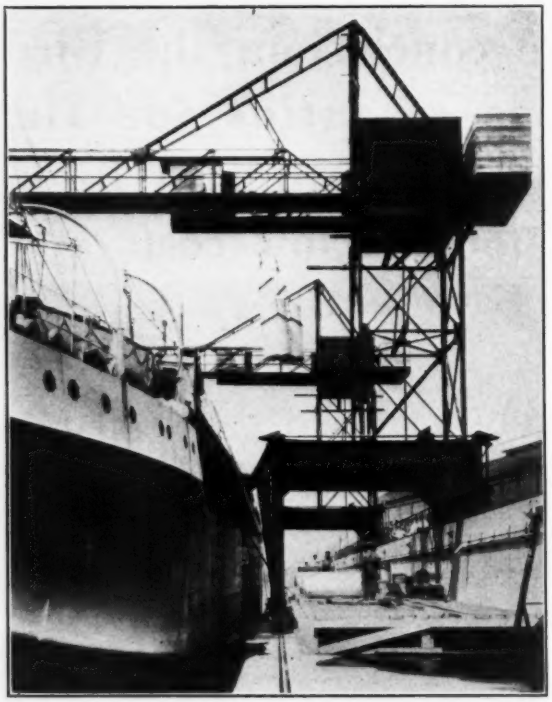


PHOTO SHOWING TWO 5-TON CRANES LOADING ROLLS OF NEWS PRINT INTO HOLDS OF THE M. S. "THOROLD."

The way that this extensive program of improvement has been carried out in such a comparatively short period of time reflects great credit upon the courageous and alert management headed by A. A. Schmon, general manager and D. L. McLeod, mill manager.

As an evidence of the complete success of this program is Mr. Schmon's statement "We are satisfied that every dollar invested in the past eighteen months in our extensive improvement program has been reflected in increased quality and efficiency of operation and I think it is generally conceded that we are producing to-day one of the finest sheets of news print on the continent".

Memorial to Milo M. Belding

[FROM OUR REGULAR CORRESPONDENT]

GOUVERNOR, N. Y., October 24, 1931—At a meeting of the directors of the International Pulp Company, held this week, a resolution was adopted out of respect to the memory of the late Milo M. Belding, treasurer of the company. It was as follows:

"The death of Milo M. Belding has removed one of the early pioneers of the industries in Northern New York. He, with his father, established in 1884 the St. Lawrence Pulp Company which was later merged into the present International Pulp Company, one of the largest talc producers in the world. The deceased was a director and treasurer of the International Pulp Company and the Oswegatchie Light and Power Company since 1903 and devoted his ability and high qualifications to their growth and development.

"The directors of the International Pulp Company are profoundly shocked by his unexpected and untimely death which occurred at his residence in New York City on October 13 and enter with deep regret the record of his demise in the minutes of their meeting of this date. The directors of the company sense deeply their loss, realizing that it will be impossible to replace him, as well as his sagacity and broad knowledge of business affairs which he used to the great advantage and profit of the firm and its allied corporations. The deceased enjoyed the respect and esteem of his many friends and associates who feel a deep personal sense of loss in his unexpected and untimely passing.

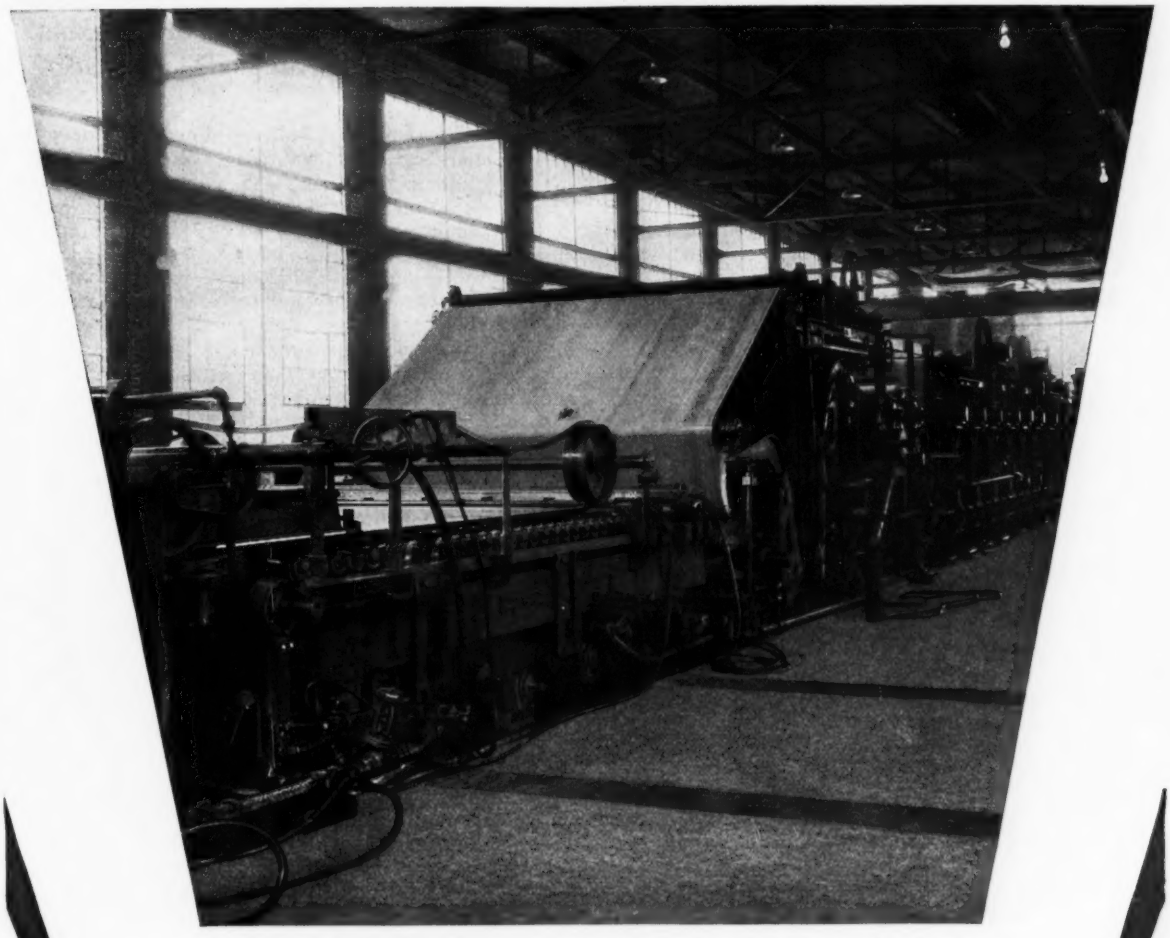
"In recognition of his high character and standing and of the many years of pleasant association with us the directors of the company, as an expression of their loss and of their deep and sincere sympathy for his family in their bereavement, direct that a copy of this memorial be delivered to his family."

F. M. Callward Discusses Reforestation

[FROM OUR REGULAR CORRESPONDENT]

GOUVERNEUR, N. Y., October 24, 1931—An address on reforestation by Floyd M. Callward, head of the forestry department of St. Lawrence University, featured the annual monthly meeting of the local Chamber of Commerce here. He discussed the proposed constitutional amendment to provide a long term program of reforestation for the state. The amendment is to be voted on at the coming election and Mr. Callward urged its support. He called attention to the fact that there are four or five million acres of idle land in this state especially adapted for reforestation purposes and also mentioned the fact that in St. Lawrence County over one million trees had been planted and one thousand acres of land purchased during the past year.

DOWNINGTOWN



SIMPLIFIED REMOVABLE ···FOURDRINIER···

Built under patents that include all the best and latest in fourdrinier design

No obstructions in machine aisle. No portable stands or rails to place in position before removing the wire part. This simplified design of the Downingtown Fourdrinier saves time and labor at the A. E. Adams Paper Co., Baldwinsville, Mass. The rails, on which the machine rolls for changing wires, are permanently located in the floor beneath removable cover plates, which are flush with the floor level. Our Catalog No. 101 completely describes the features of the modern Downingtown Fourdrinier and contains a layout of a complete machine. Write for it now. The Downingtown Manufacturing Co., Downingtown, Pennsylvania.

Northern Paper Mills Build New Laboratory

Building Recently Completed at Green Bay, Wis., Is To Be Devoted Practically Altogether To Technical Research—Improvements Will Effect Economies of Operation, Bring About Improvements in Processes and Products and Introduce New Methods and Lines

ON December 15, 1930, the construction of a research laboratory building for the Northern Paper Mills, Green Bay, Wis., and associated companies was begun. The building has now been completed and partly equipped. It is situated about three hundred feet east of the mill on land previously acquired by the company. It is about two hundred feet back from Day Street and faces south. It is to form a detached back unit of a hollow square of office and administration buildings to be built in the future.

Concrete, Brick and Steel Structure

The building is 106 x 32 feet, extending east and west and is two stories in height, but without basement. It is constructed of concrete, brick and steel. All walls and partitions are of Haydite blocks but with a veneer of face brick on the front and both ends and with stone cornices and stone entrance. The back is unfinished, except for a stucco coat on the Haydite blocks, so that future expansion may be taken care of without disturbing the present structure. Interior walls are plastered in the offices and small laboratories but unfinished in the process laboratory and digester room. Floors are of re-enforced concrete covered with battleship linoleum in the laboratories and with asphalt tile in the office and halls. On both floors a six foot hall extends nearly the length of the building at the back with the laboratories to the front. When additions are built this hall will be a central hall with laboratories opening from it on each side. The building is equipped throughout for steam, compressed air, vacuum, gas, hot and cold water, distilled water, and electricity at 110 volts A.C., 220 volts A.C. and 110 volts D.C.

The building includes (1) an office, 12 x 15 feet; (2) a process and development laboratory, 30 x 32 feet; open to the roof except for a balcony along two sides; (3) a general analytical laboratory, 23½ x 27 feet; (4) a small laboratory 15 x 23½ feet; (5) a library and directors' room, 20 x 30 feet; (6) three other laboratories, one 15 x 23½ feet and two, 12 x 23½ feet; (7) balance room; (8) storerooms and closets.

The process and development laboratory contains apparatus for measuring and pulping wood and for pulp testing including a stainless steel lined and steam-jacketed digester with control instruments, a blow-pit tank, a 24-inch wet machine, a four plate flat screen, mixing tank and pumps, a standard cord rack, submerging and measuring tanks for cordwood, and weighing scales. On the balcony, through which the digester extends, are a laboratory desk, and sheet machine, electric sheet drier, hydraulic press, a 1½ pound beater stainless steel ball mill, freeness tester, and two acid-making tanks.

The General Laboratory

The general laboratory contains two central, laboratory tables, each 4 x 12 feet with piping, stone tops, ceramic sinks, and wooden drawers and cabinets. Also there are two fume hoods and a steam bath, each 2½ x 5 feet with stone table tops, transite hoods and wooden cupboards. Ovens and muffle furnace and writing desks for the chemists are also here, with space for supplementary equipment as necessary.

The Smaller Laboratory

The smaller laboratory has a chemical wall desk and sink and a small hood and three tables 2½ x 6 feet. In this laboratory are temporarily located, pending the installation of constant humidity room, a microscope table with accessories, and the paper testing instruments, these being a motor-driven tensile tester, motor-driven bursting

LEFT: PAPER TESTING INSTRUMENTS. RIGHT: ANALYTICAL LABORATORY.

P·M·C

AT YOUR SERVICE—AS EVER

THROUGH a consolidation PAPER MAKERS CHEMICAL CORPORATION will now have available the manufacturing, research and other facilities of HERCULES POWDER COMPANY, one of America's leading producers of essential chemical raw materials, to aid in extending service to the Paper Industry.

A world-wide marketing organization, and an increased line of paper-making and industrial chemicals are made available to PAPER MAKERS CHEMICAL CORPORATION.

We desire to continue to merit the good will and patronage of the Paper Making Industry.

SUPERIOR

ROSIN SIZE SATIN WHITE

CALCIUM ALUMINATE

and other

INDUSTRIAL CHEMICALS

PAPER MAKERS CHEMICAL CORPORATION

KALAMAZOO, MICHIGAN

Kalamazoo, Mich.	Boston, Mass.	Savannah, Ga.
Wilmington, Del.	Albany, N. Y.	Atlanta, Ga.
Milwaukee, Wis.	Lockport, N. Y.	Marrero, La.
Easton, Pa.	Carthage, N. Y.	Portland, Ore.
Holyoke, Mass.	Pensacola, Fla.	Burlington, Ont.
Stoneham, Mass.	Jacksonville, Fla.	Erith, England

P·M·C

LEFT: PRIVATE LABORATORY. RIGHT: DIRECTORS ROOM AND LIBRARY

tester, motor-driven folding tester, tearing tester, micrometer, and paper scales.

In the adjacent balance room are installed an analytical balance, two rough balances, and a barometer.

Library and Directors' Room

The library and directors' room is a large room 20 x 30 feet and it serves two purposes. First as a directors' room, and second as a library. It is entirely panelled with stained birch panelling except for one end which contains shelving and a stone fireplace. It is carpeted, indirectly lighted and contains a large table and chairs. This table and chairs are also used for the library function. A magazine rack, pamphlet and patent file and card catalog complete the furniture. The books include the bound back volumes of the American Chemical Society, sets of reference books on organic, inorganic, physical, analytical, and industrial chemistry, with numerous single volumes dealing with paper and pulp making and testing and related subjects. Numerous reprints, pamphlets, government bulletins and patents are received and indexed.

The three other laboratories mentioned are not now equipped, but are temporarily in use as offices by two departments of the main office.

The Staff

The staff at present consists of the director, Dr. Merrill A. Youtz and two assistants. Dr. Youtz is a graduate of Lawrence College at Appleton, Wis., and received the Ph.D. degree from Massachusetts Institute of Technology. He was for eight years previous to the present connection on the research staff of the Standard Oil Company of Indiana. E. H. Johnson is also a graduate of Lawrence College with a Ph.D. degree from the University of Illinois. He was for several years a chemist for the Fox River Paper Company of Appleton, Wis. Dr. B. E. Lauer is a graduate of Oregon State College with a Ph.D. from the University of Minnesota.

Belief in Technical Research

It is believed that with the above-mentioned personnel and equipment, together with later additions as necessary, it will be possible very thoroughly to investigate many technical phases of the manufacture of products of the Northern Paper Mills and associated companies, maintaining and advancing the present high standards of those products. The establishment of this laboratory by the directors of the Northern Paper Mills evidences their belief that technical research is not only desirable but increasingly necessary in pulp and paper making in order that economies of operation may be effected, improvements in processes and products brought about, and new processes and new products be introduced. The construction and equipment of this laboratory is only the latest of a long sequence of forward-looking improvements in the Northern Paper Mills. These have extended over the last several years, and they, together with the careful selection of men, place the company among the leaders in their field of pulp and paper manufacture.

Ernest S. Reid Co. to Expand

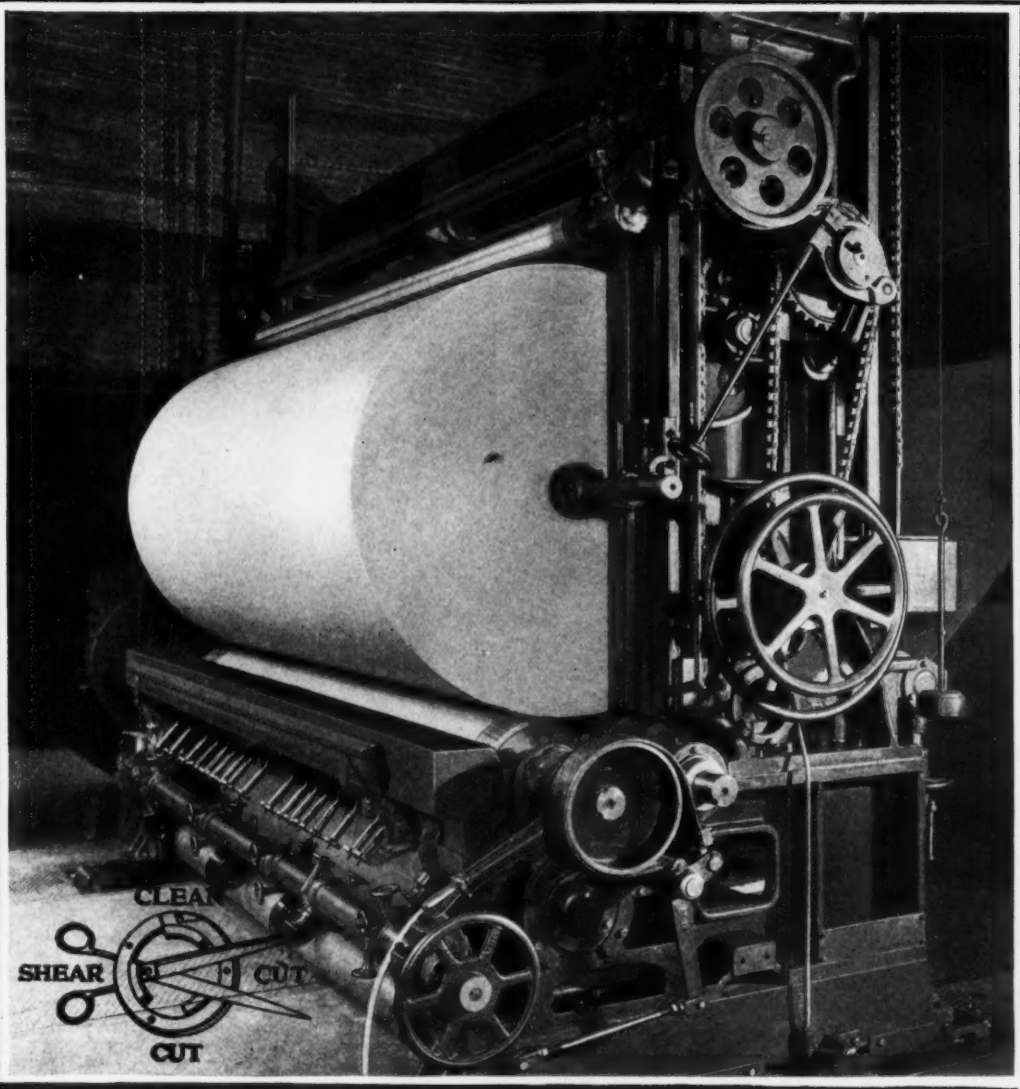
[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 26, 1931—Ernest S. Reid has announced the opening of the office of the Ernest S. Reid Company, handling paper and paper products, in Suite 15, Little Building, as New England representative for American Lace Paper Company, American Lakes Paper Company, E. A. Bulman Manufacturing Company, The Crystal Tissue Company, Diana Manufacturing Company, the Gardner & Harvey Company, Kleen Products Company, the Lawrence Bag Company, and Miami Valley Coated Paper Company.

Mr. Reid's program of expansion includes the addition to his staff of C. L. Hollis and Miss Josephine Balboni. Among the lines he handles are tissue paper, plates and cups, napkins, designed wrapping paper, bags and coated paper. He is in a position to facilitate club car shipments from four Miami Valley Mills which are among the group he represents, viz., Crystal Tissue, Gardner & Harvey, Lawrence Bag, and Miami Valley Coated Paper. His telephone number is Hancock, 6178.

In 1920, Mr. Reid, who is well known in the trade, was manager of the Logan Drinking Cup Company, Division of the United States Envelope Company, with headquarters at Worcester, Mass. In 1925 he succeeded Frank Van da Linda, a pioneer specialty man in this country, as manager of the specialty department of Stone & Forsyth Company, and was five years with that company. For several months he has been representing the mills mentioned.

a clean cut ~ a sure cut ~ a shear cut ~



LANGSTON
Slitters & Rewinders

EVERY roll is firmly wound, square-edged and *dust-free*. From the first wrap, up to the maximum diameter, Langston Slitters work smoothly, efficiently, economically. Users report exceptional savings in labor, waste, repairs, etc.—as much as $6000 in one year—with Langston's. It is wisdom to replace *costly* old equipment with Langston's. You'll probably pay for the new machine in a few years, out of the savings it effects. Don't believe it? We are ready to show you!

SAMUEL M. LANGSTON CO., *Camden, N. J.*

~ a shear cut ~ a sure cut ~ a clean cut ~ a shear cut ~ a sure cut ~ a clean cut ~ a shear cut ~

~ a shear cut ~ a clean cut ~ a sure cut ~ a shear cut ~ a clean cut ~

Crystal Tissue Co. Completes Plant Extension

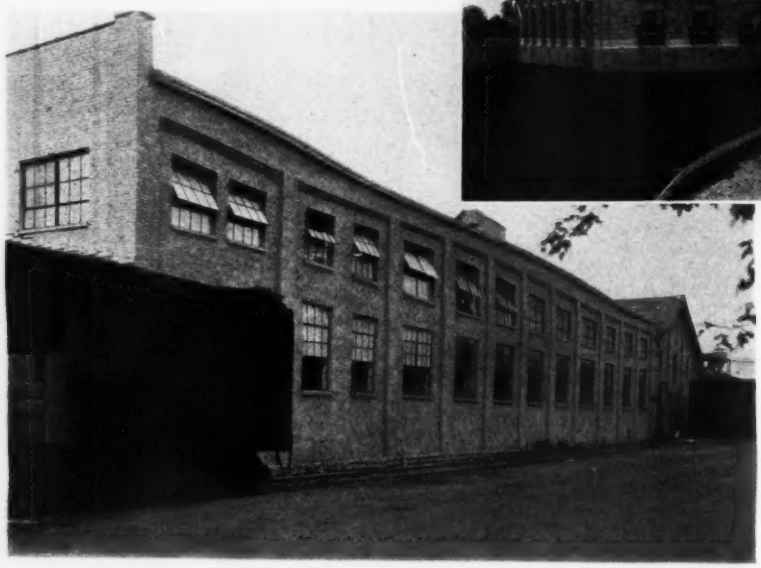
New Machine Room Building Constructed Over Old Mill at Middletown, Ohio—Tissue Fourdrinier Installed, With Wire Width of 136 Inches, Increasing Number of Machines to Seven—Modern Structure Built to House Office Force

CRYSTAL Tissue Company, of Middletown, Ohio, has expressed its faith in the future growth of its business in a very tangible way, by spending hard money for the improvement and extension of its plant. Several extensions and improvements have recently been completed. According to Z. W. Ranck, president, the company is now in better shape than ever before to make at low cost the line of high quality tissues and waxed papers which are so well known to the trade.

Three construction projects undertaken have been the construction of a new office building, the reconstruction of the machine room building of the "Old Mill" and the installation of a second tissue Fourdrinier machine in the "New Mill," increasing the number of paper machines to seven.

Prior to June of this year, the office force was housed in a delightful old brick building, for years a residence, which for over a century has been a landmark of the community. Although comfortable and possessing the charm of age, the increasing business of the company and need of increased office employees had made it necessary to abandon the old building.

NEW OFFICE BUILDING



THE OLD MILL AFTER RECONSTRUCTION.

New Office Building

The new structure is a handsome building of buff brick, of modernistic design. The visitor, ascending a wide flight of steps, enters a beautiful and spacious lobby. At the left is the private office of the president, occupying the northeast corner of the building. Along the north side are the private offices of the treasurer and the secretary, a Board room and the quarters of the accounting department.

To the right of the lobby are the private offices of the development manager and sales manager. Along the south side is a large office for the sales department and private offices of purchasing agent, production manager and cost and personnel manager. A large room, running from lobby to east wall provides liberal space for stenographers and filing clerks.

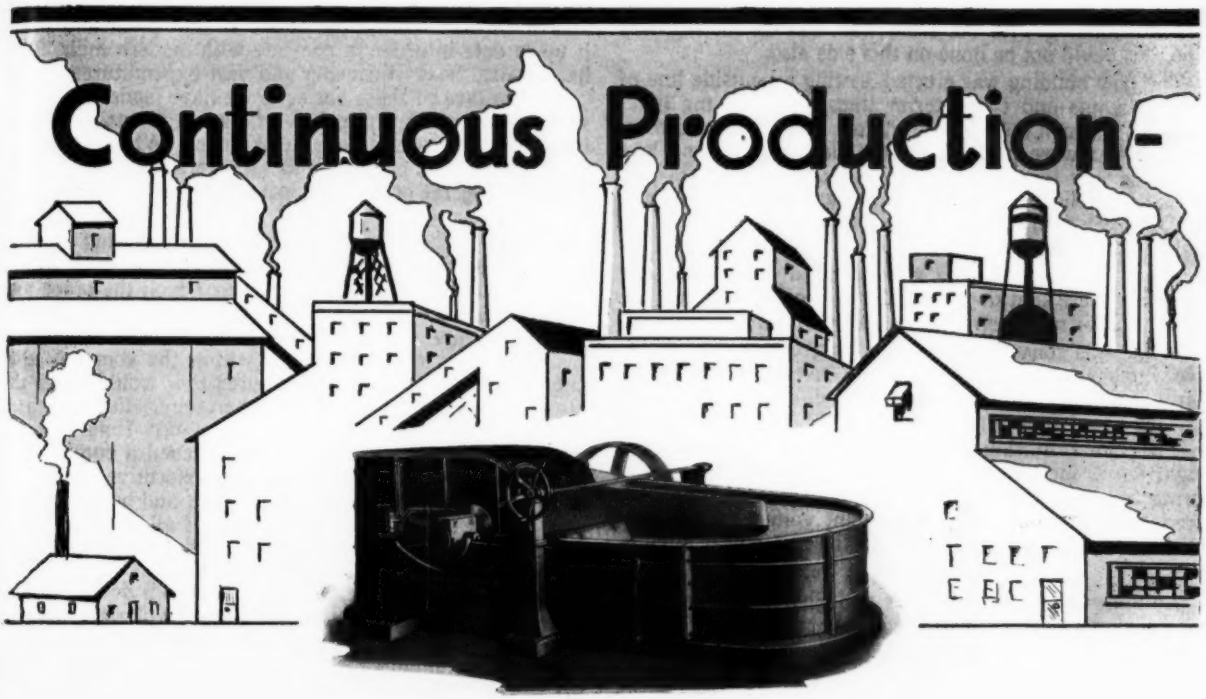
The main floor of the building is at such elevation as to provide a roomy basement, with floor at ground level providing space for a roomy laboratory, private offices for chemical engineer, superintendent, mill manager, development engineer and employment office, as well as a commodious sample room, filing vault, and kitchen.

The central part of the ground floor has been prepared as an assembly room. The assembly room is large enough for a meeting of all employees of the company. This assembly room has an elevated speaker's platform and is wired for radio and projection apparatus. The plans for this building were prepared and construction supervised by Schenk & Williams, architects, of Dayton, Ohio.

In the "Old Mill" three machines were housed in buildings erected at various dates. Low roofs and presence of interior walls made operating conditions poor with lack of suitable light and ventilation.

Old Mill Reconstructed

A new building was designed for construction over the



Uninterrupted Production— Means Profits!

In these days when everyone has difficulty in keeping the "wheels turning"—when whole industries are stagnant—it is in these days that the wise man checks up to make sure that everything is in A-1 shape for uninterrupted production in the better days sure to come.

*Buyers want better paper too, and you must meet the demand or lose business.

Don't wait until you are being crowded for shipments and trying to rush production, now is the time to check your Beater Room needs.

Dilts New Type Beaters will enable you to make better paper and enjoy uninterrupted production. They will save time, labor, power and expenditures for repairs—and earn real profits for you too.

Check up now. Let our engineers help you. Consult with them—now is the time. They are at your service. No obligation incurred.

-Dilts-

MACHINE WORKS Inc. FULTON, N.Y.

"Your Paper Is Made in Your Beaters"

** This series of advertisements is reprinted by request as being the most timely and appropriate in the industry.*

old buildings, setting the rear wall several feet outside of the old building. As the front wall was on the highway line, this could not be done on this side also.

The new building was erected, setting an outside line of steel columns and two interior lines, lowering the latter columns through holes cut in the old roofs. Roof girders and purlins were placed and roof deck and roofing laid, working over the old roofs. The front wall was in part wrecked to the foundation and in part extended upward. Large steel sash was used throughout, providing ample light and ventilation.

When the new building was practically completed the machines were shut down and the old roofs wrecked. Interruption of operation was limited to one week.

While this construction was in progress, installation of No. 7 machine was going on in the "New Mill," in space provided when the last previous building addition was erected about four years ago.

The No. 7 machine has a wire width of 136 inches, eighteen 42 inch driers, one calender stack and a double drum winder. The machine is driven by a Westinghouse sectional drive, operating at constant voltage, with direct current power taken directly from the mill power circuits.

Installation Has Novel Feature

Auxiliary equipment includes two Shartle Miami No. 1 motor driven Jordans, two Bird screens and Nash suction pumps. A novel feature of the installation is the two section hood, arranged to raise and lower to permit passage of a crane from wet end to dry end or for use of the crane on the drier part. When not raised for such purposes, the hood sits closely down over the drier part.

By use of suitable gearing and antifriction bearings, either hood section can readily be raised by means of a hand chain as easily as operating a chain hoist. Sheets of copper content steel were used in the construction of the hood, and as added protection against corrosion, coated with an alloy of lead and tin. Telescoping uptakes connect with wood ventilators on the roof.

Designs for the reconstruction of the "Old Mill" and for installation of the No. 7 machine, with detail designs of the special features of the machine construction were prepared by B. M. Baxter, consulting engineer, of Grand Rapids, Mich., who has since become associated with the company as mill manager.

F. Pagenstecher Leaves Bryant Paper Co.

KALAMAZOO, Mich., October 26—The resignation of Felix Pagenstecher as president and general manager of the Bryant Paper Company has been tendered the board of directors and will become effective Nov. 15. Announcement was made last Thursday afternoon, though the Bryant board has known of Pagenstecher's intentions for several weeks. The formal statement reads:

"Because of long standing disagreements between certain members of the board relative to the management of the Bryant Paper Company and its policies, I have tendered my resignation as president and manager to take effect Nov. 15.

"It is with sincere regret that I am severing my business relations with the many loyal associates and friends who have worked with me so earnestly to achieve a definite goal.

"My plans for the future will be announced later."

(Signed) FELIX PAGENSTECHER.

The disagreements referred to date back many years, according to Mr. Pagenstecher, almost from the beginning of the extensive improvement program made necessary to almost entirely rebuild the entire Bryant plant and bring it up to date in order to compete with modern mills. This has entailed heavy financing and vast expenditures.

"In the face of these obstacles we have made progress," said President Pagenstecher. "Our semi-annual report issued in June was a satisfactory one. While unable to show a profit and pay dividends, we were holding our own, in fact doing far better than many persons had been led to believe.

"I have the personal satisfaction of knowing that in leaving the office of president, I am turning back to the stockholders a better mill than when I took the office and I also believe a better working organization.

"Despite my knowledge along that line, I have long realized that a condition exists within the company that only a major operation would cure; that would quiet the disorganizing elements and bring harmony. For months I have contemplated resigning. In fact last June I determined to take such action, but we reached a compromise at the time by the appointment of an executive committee of three to work with both management and board and act as a go-between in the consideration of all policies. This committee has worked splendidly but has never been able to bring about satisfactory understanding.

"All along I have been confronted with a desire to protect the interests of the stockholders. Not only has the non-payment of dividends been serious to them, but serious to the community as a whole. For those reasons I was particularly anxious to again show profits. Every policy I have proposed has met with the cordial support of the committee and a majority of the board. But it was all to no purpose, so several weeks ago I notified them of my intended resignation. At their request I have not made that decision public until today. I am now free to make plans for the future."

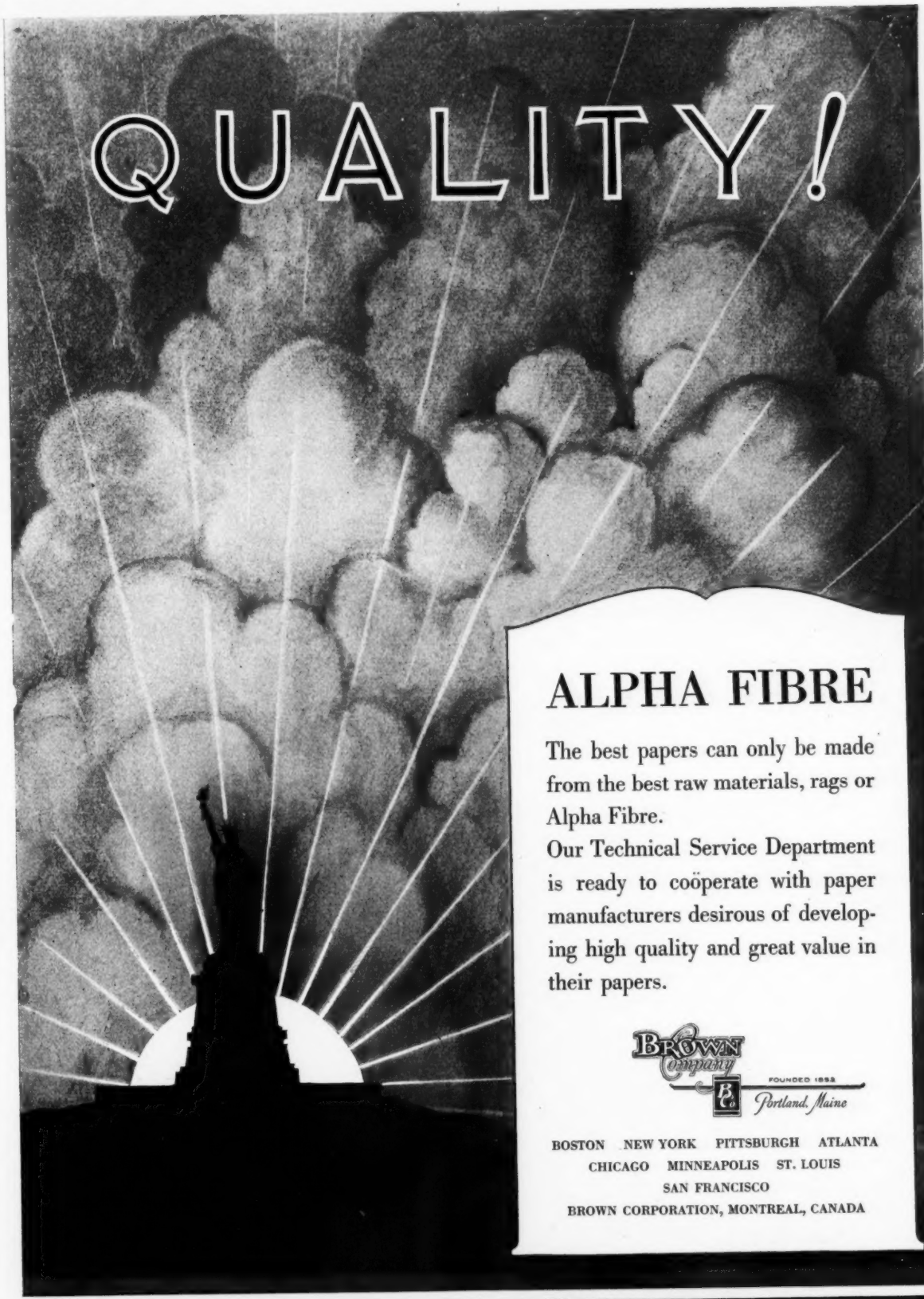
Felix Pagenstecher has been actively engaged in the paper industry in Kalamazoo for a period of nearly 30 years. He came here in 1902, at which time the first unit of the Riverview Coated Paper Company was built. He continued as secretary of that concern until 1919, when he was appointed as assistant to the late Frank H. Milham, then president of the Bryant Paper Company. Mr. Milham died in May, 1921, and in June of the same year Pagenstecher was advanced to the executive seat.

The Bryant Paper Company's plant at the time was recognized as the largest book mill in America. Ten machines were operated. It was under the Pagenstecher administration that the plant over 25 years old was entirely rebuilt and decided savings in the costs of production effected.

W. B. Milham, vice president of the Bryant Paper Company, said Friday morning: "We have not as yet named a successor to Felix Pagenstecher, but expect to in the near future. That matter is now in the hands of our executive committee, composed of W. E. Kidder, W. J. Lawrence and Frank McAllister. There is no statement to make at this time."

Sitka Spruce Company Fined

PORTLAND, Ore., October 22, 1931—The Sitka Spruce Pulp and Paper Company, Empire, Ore., which operates a pulp mill and a saw mill in Lower Bay, was penalized $50 by Justice Maybee of the Court in North Bend for dumping sawdust in water where it is said to be a menace to clams, fish and other marine life. The law strikes at all companies in the Bay district whose waste products might contribute to an unsanitary condition in adjacent waters.



ALPHA FIBRE

The best papers can only be made from the best raw materials, rags or Alpha Fibre.

Our Technical Service Department is ready to coöperate with paper manufacturers desirous of developing high quality and great value in their papers.

BROWN Company B.C. FOUNDED 1852 Portland, Maine

BOSTON NEW YORK PITTSBURGH ATLANTA
CHICAGO MINNEAPOLIS ST. LOUIS
SAN FRANCISCO
BROWN CORPORATION, MONTREAL, CANADA

P. H. Glatfelter Co. Installs Sixth Machine

Built by Pusey & Jones Corp., New 190-Inch Fourdrinier Surpasses All Other Units In Modern Appliances, Manufacturing Speed and Production—Running Parts Are Constructed for Maximum Operating Speed of 800 Feet Per Minute

THE P. H. Glatfelter Company, of Spring Grove, Pa., have always enjoyed a country-wide reputation for their high-grade book, magazine and bond papers, and Monday, December 22 last, when paper for the first time was made on their new machine, recently installed by the Pusey & Jones Corporation, of Wilmington, Del., marked another mile-stone in their long history of ever-increasing efficiency and economy in the production of better papers.

Actually the stock was put on the wire at 10:20 in the morning and paper on the reel at 11:35 which is believed to be some record or other, only a few minor adjustments being necessary before the machine became a full fledged paper maker.

Latest Design and Construction

This machine, known as P. M. 1563, is their sixth paper making unit, there being already in service 62, 82, 64, 100 and 170-inch machines. It is the largest of all, 190 inches width of wire, and surpasses the others in modern appliances, manufacturing speed and production, being of the very latest design and construction throughout.

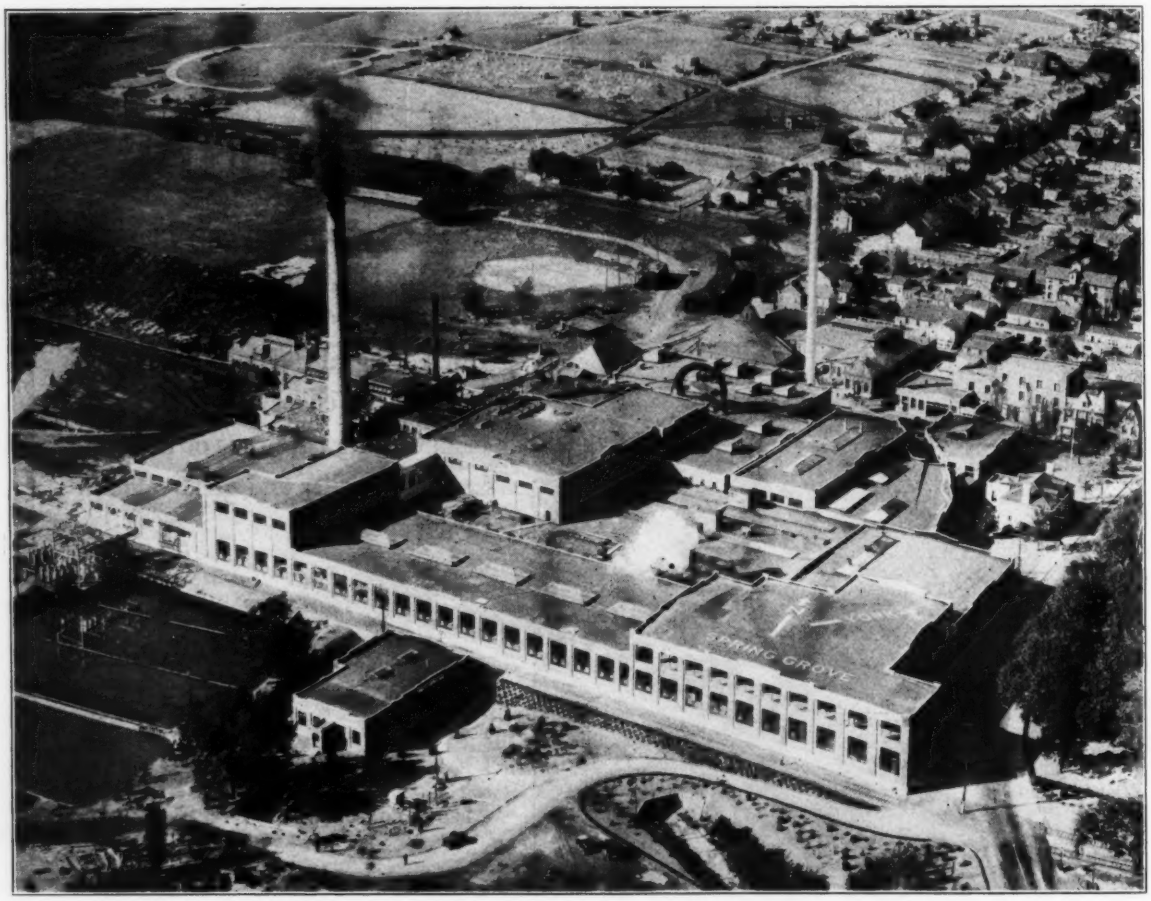
The abridged specifications, with the exception of a few special features the property of the P. H. Glatfelter Company, are as follows:

Head box of brass fitted cypress in combination with a special Van de Carr stock inlet 30 feet high and two straight slices 14 inches high.

Fourdrinier part arranged for wire 190 inches wide, 75 feet long, with 36 inch diameter suction couch roll having cantilever attachment. Six flat suction boxes having motor driven oscillating devices, 7 inch diameter table rolls, 26 inch diameter breast roll, 12 inch diameter return wire rolls, 16 inch diameter dandy roll, removable type wire handling arrangement arranged with latest pitch adjustment and high speed shake, motor driven Pusey & Jones adjustable shake head; all rolls are equipped with anti-friction bearings having improved mountings.

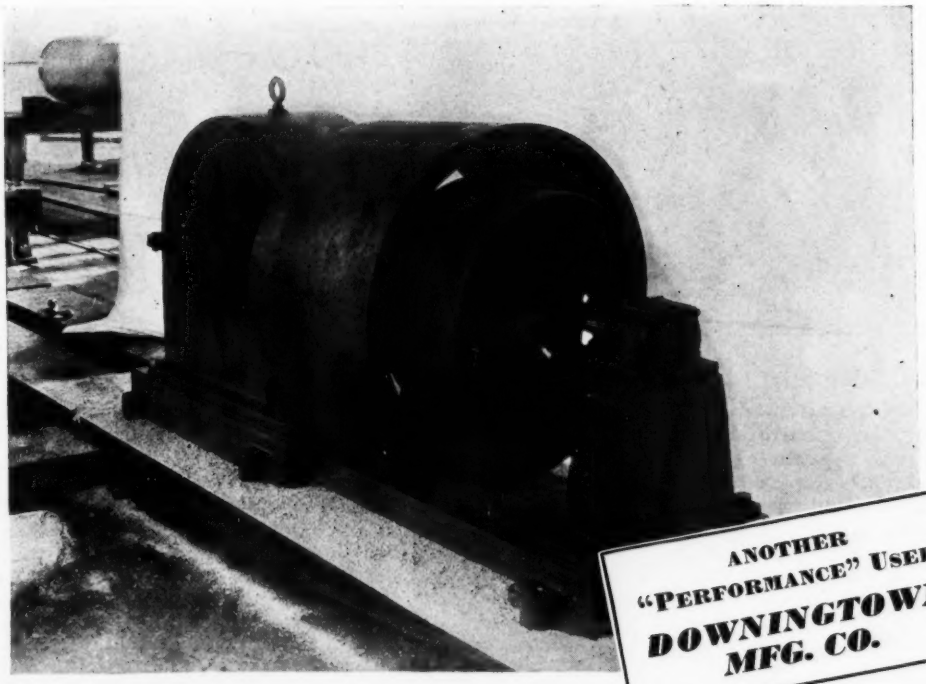
Latest Type Press Rolls

Press part with two 28 inch diameter rubber covered lower press rolls and 28 inch diameter upper stone rolls,



ADDITION FOR NEW FOURDRINIER IS SHOWN IN THE IMMEDIATE FOREGROUND.

MODERNIZATION MUST CONSIDER SKF BEARING PERFORMANCE!



WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

In every phase of paper making, SKF Bearings are one of the major factors seriously considered in modernization programs. Where the utmost dependability together with consistent production at low cost levels must be maintained there is definite evidence that SKF Performance Takes Preference Over Price . . . every time.

For a brute job such as this Downingtown 85 H. P. Section Drive, eight SKF Ball and Roller Bearings share a definite responsibility in keeping the mill producing. There is more than enough of stamina to assure the most economy per bearing dollar. And because these bearings show no wear, need no adjustments, the life of gears is increased and initial efficiency of the drive is prolonged.

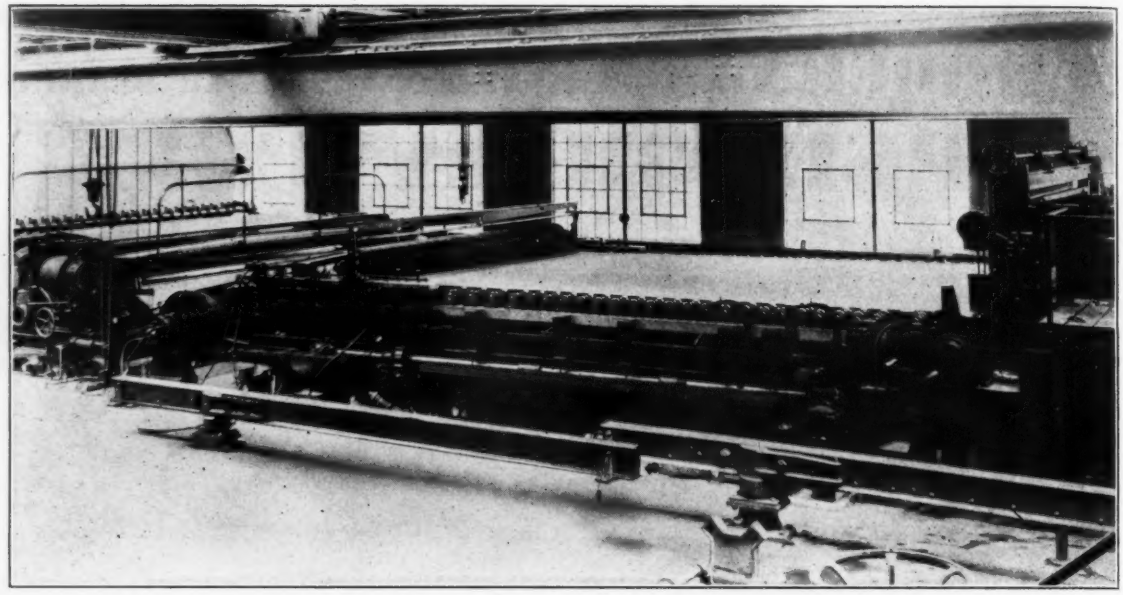
You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.

2798

SKF INDUSTRIES, INC. 40 EAST 34th STREET, NEW YORK, N. Y.

SKF

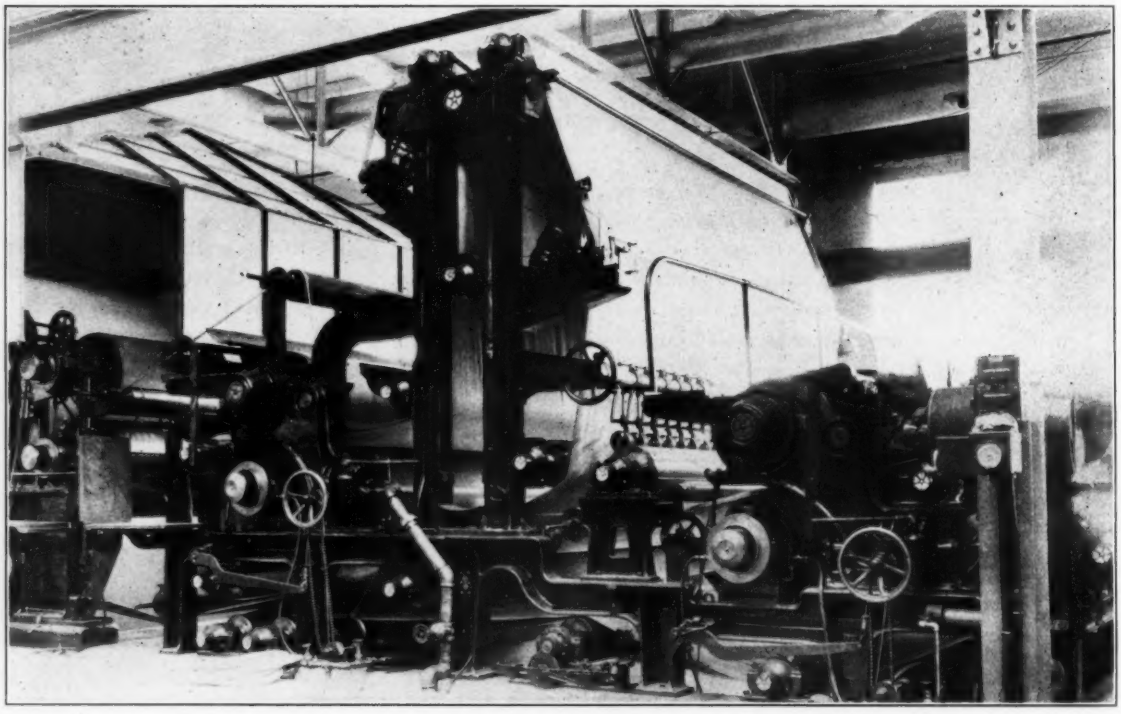
Ball and Roller Bearings



REMOVABLE TYPE FOURDRINIER WITH SUCTION COUCH ROLL.

the second press arranged with reversed felt; 12⅝ inch diameter rubber covered felt carrying rolls, water marking device, Sheahan patent rope carrier for threading paper through second press, one set of smoothing rolls without felt. All paper and felt carrying rolls, also top main press rolls are equipped with anti-friction bearings having improved mountings; lower main press rolls equipped with latest type collar oiling bronze lined bearings.

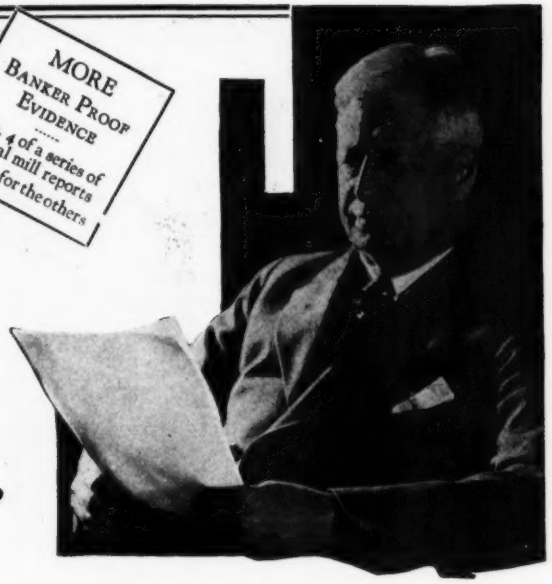
Dry part comprising thirty-one 60 inch diameter drying cylinders and two 48 inch diameter felt driers arranged in two sections with a breaker stack comprising one 16 inch diameter top and one 24 inch diameter lower chilled iron rolls located between the sections. Felt carrying rolls 12⅝ inch diameter equipped with anti-friction bearings having improved mountings. Sheahan patent rope carrier for threading paper through the dry part. Bowser gravity feed lubricating system for main drier bearings of latest collar oiling bronze lined type.



PRESS PART WITH TWO MAIN PRESSES AND WATER MARKING DEVICE.

MORE BANKER PROOF EVIDENCE
No. 4 of a series of actual mill reports
Watch for the others

"H'm...looks as though that TENSILASTIC Roll is going to save us a lot of money... $4,305.35 in fact"



You'd say so, too, if you had before you the facts and figures of the report of a New York State tissue and towelling mill now in our files.

This mill (name on request), on its Number 6 machine, over a five-year period, struck an average of 48 days between grindings on its rubber press rolls.

Then they installed a Tensilastic Rubber Press Roll . . .

And the TENSILASTIC immediately RAN THE RECORD UP TO 248 DAYS WITHOUT GRINDING!

FIVE TIMES AS LONG AS THE BEST PREVIOUS RECORD!!

Previous rolls required recovering on an average of every 2½ years.

THE TENSILASTIC, INSTALLED IN DECEMBER, 1929, IS STILL PRACTICALLY GOOD-AS-NEW!!

The fifteen years potential service built into TENSILASTICS outlasts the ordinary roll life 6 to 1. . . .

Study the following analysis of the above report. And if you have any suspicion of a doubt of your findings or ours, have your banker verify them. . . .

ORDINARY RUBBER PRESS ROLL

6 replacements in 15 years at $241	$1,446.00
Interest, $1,446 at 6% (mean of 7½ years)	650.70
Grinding every 48 days at $20	2,280.00
Interest, $2,280 at 6% (mean of 7½ years)	1,026.00
Total cost, purchase and maintenance	$5,402.70

TENSILASTIC RUBBER PRESS ROLL

15 years potential service at $241	$241.00
Interest, $241 at 6% for 15 years	216.90
Grinding every 248 days at $20	441.00
Interest, $441 at 6% (mean of 7½ years)	198.45
Total cost, purchase and maintenance	$1,097.35

$4305.35 ACTUAL SAVINGS EFFECTED BY REPLACING ORDINARY RUBBER ROLLS WITH TENSILASTICS! And the riddance of annoyance, of interrupted production and the expense of shipping rolls back and forth.

TENSILASTIC'S superiority is not a matter of chance. It is a superiority definitely built into the rolls by American Wringer Company's exclusive method of laboratory design and laboratory control of each individual roll,—a method that makes it possible to duplicate any roll, in every specification, again and again at any time.

Install a trial TENSILASTIC. Check its performance critically. Compare it with other rolls. You'll gain a new conception of roll performance . . . and SAVE MONEY!

Write for your copy of the interesting booklet "TENSILASTIC and What It Means"

American Wringer Co., Inc.

Rubber Roll Specialists for More Than 40 Years

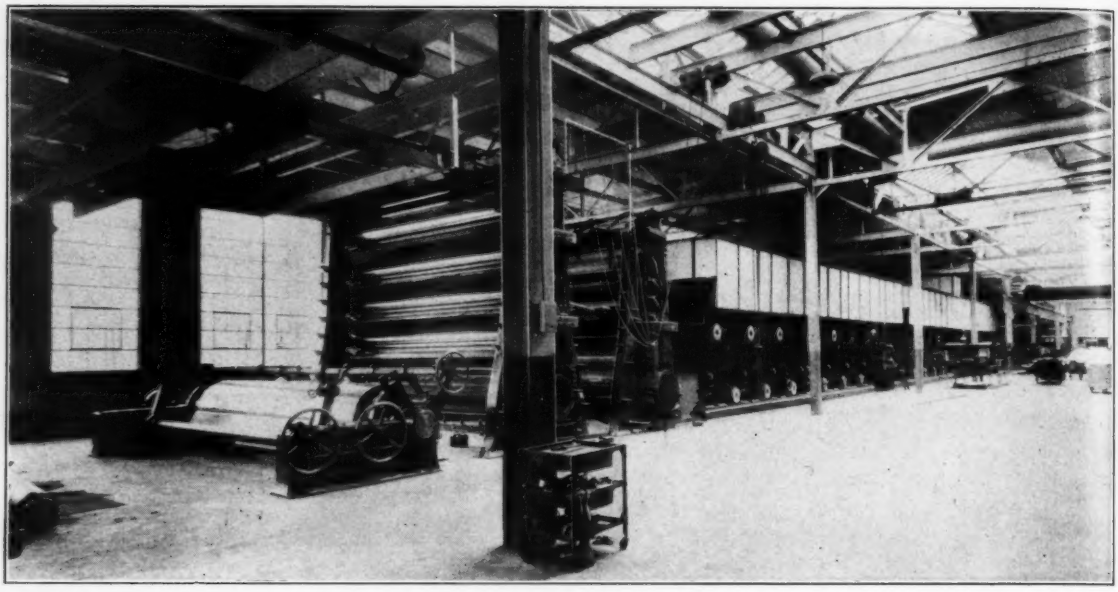
Woonsocket, R. I. Farnham, Quebec

33 No. La Salle St., Chicago — Pacific Coast Representative: Walter S. Hodges, Lewis Bldg., Portland, Ore. — 461 Eighth Ave., New York

TENSILASTIC

RUBBER ROLLS

T22



VIEW FROM FINISHING END OF MACHINE.

Two stacks of calenders, the first containing seven rolls and the second nine rolls, of 20 inch diameter top, 14 inch diameter intermediate, 20 inch diameter next bottom and 30 inch diameter bottom rolls equipped with flexible ductors and motor lift.

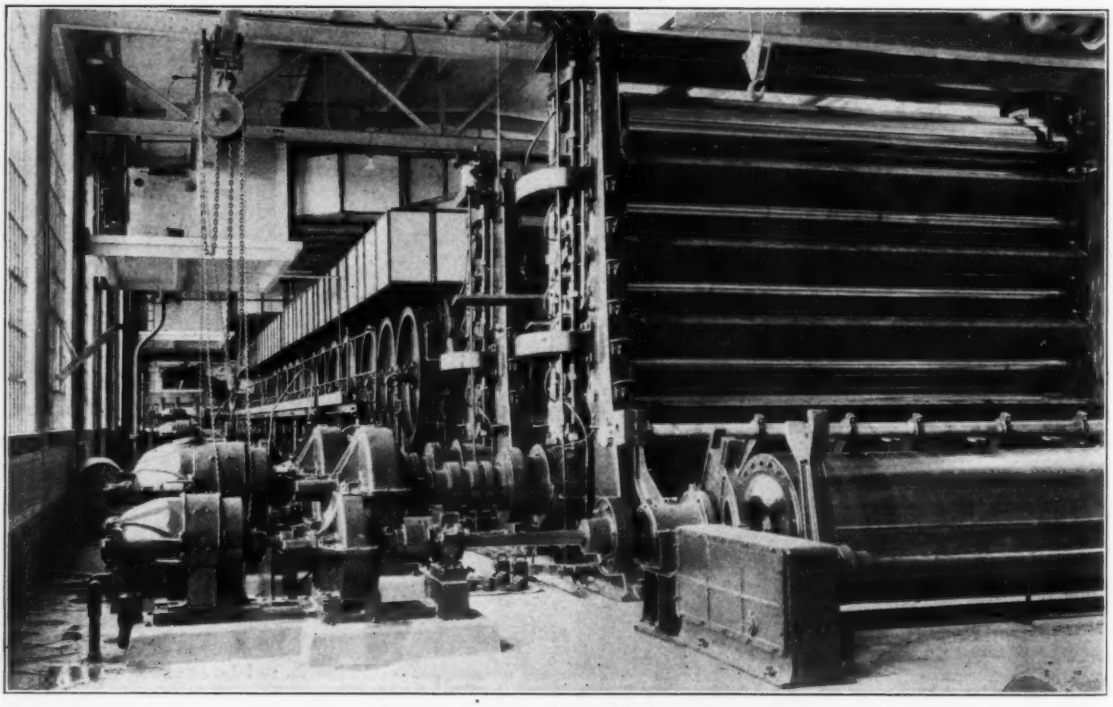
Improved type Pope patent uniform speed reel with 42 inch diameter driving drum and 12⅝ inch diameter reeling drums; also improved unwinding stands with water cooled friction arrangement all equipped with anti-friction bearings.

All running parts are constructed and tested for a maximum operating speed of 800 feet per minute, which is obtained by means of the latest type sectionalized motor drive manufactured by the General Electric Company.

Splendid Building Extensions

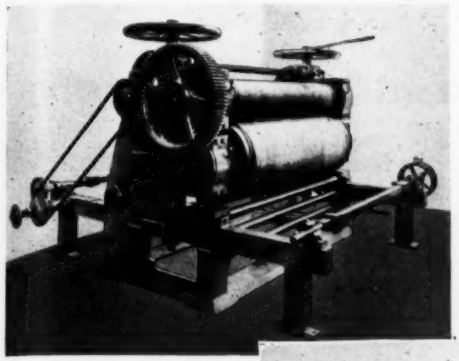
One of the problems involved, and successfully overcome was the moving of the main line of the Western Maryland Railroad, to provide space for the building extensions.

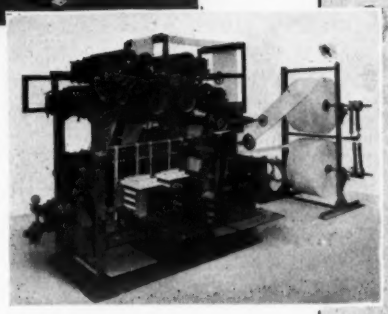
Much credit for the successful starting of this machine and the splendid building extension in which it is housed is due to the interest and efforts of P. H. Glatfelter, presi-



VIEW OF MACHINE ALONG DRIVING SIDE.

. . . Why WALDRON *for Converting Machinery*





Coating Machines

Embossing Machines

Engraved Roll Printing Machines

Festooning Machines

Gumming, Waxing & Saturating Machines

Pasting and Combining Machines

Crepeing Machines

Winders and Slitters

Automatic Web Guides

Specially designed machinery for particular processing requirements.

At Top—Waldron Centennial Embosser—an open front model with split boxes that permits quick change of rolls without need for removing entire box.

Lower — The Centennial Napkin Printing — Embossing—Folding Machine. Performs all necessary operations including sheer cutting and counting—500 napkins per minute without excessive wear or vibration.

Specifying Waldron equipment means more than securing dependable, faultlessly built machines. It means adopting a modern method for increasing quality and output with consequent lowering of unit production costs.

To justify inclusion in the Waldron line of products - a machine must offer decided advantages over other types in operating conveniences and economies —in improved quality of finished product. It must be particularly designed to accomplish these objectives.

A splendid example of this Waldron characteristic is the Waldron Centennial Napkin Machine that now makes it possible to produce perfectly fashioned paper napkins, completely processed at sufficient speed to insure production that is really profitable.

A study of the Waldron line of machines will reveal practical ways to reduce operating costs in paper converting plants. Tell us the class of equipment you are interested in and we will send you descriptive literature.

JOHN WALDRON CORPORATION

MAIN OFFICE AND WORKS, NEW BRUNSWICK, N. J.

NEW YORK
122 East 42nd Street

CHICAGO
201 North Wells Street

PORTLAND, ORE.
311 Lewis Bldg.

WALDRON

Paper . Converting Machinery

dent of the company, and a former president of the Technical Association of the Pulp and Paper Industry, who gave his personal attention to many of the important details having to do with the installation.

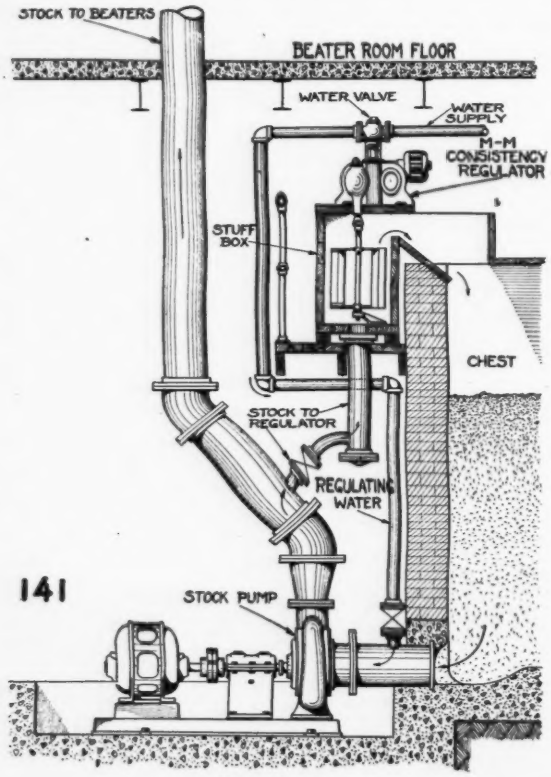
. S. C. Wentz, superintendent, and E. F. Troop, chief engineer of the company, also contributed in no small measure to the successful operation.

The Shoemaker Bridge Company, represented by L. R. Widdicombe, designed the new buildings and supervised the construction. The building contractor was R. Hostetter Co., Inc., York, Pa.

The erection of the machine in the mill was supervised by G. M. Brodley, of the Pusey & Jones Corporation's field erection staff.

Parker-Young Co. Solves Knotty Problem

The Parker-Young Company, of Lincoln, N. H., representative producers of sulphite and ground wood products, manufacturing each of these raw materials at their own plant for subsequent use in paper making, recently solved the problem of obtaining uniformity of stock density before the beaters, so that the beating process and the non-fibrous paper making materials could be made very uniform. Another important phase lay in the accounting end of the control, an activity which can be carried out only if quantities are held uniform by a reliable automatic method. As a large volume of stock had to be regulated in a very short time, due to intermittent operation, this installation presented a knotty problem. Regulation had to be maintained within the guaranteed limits and operating reliability was absolutely necessary.



FLOW SHEET.

A slush stock distributing system was already installed, consisting of an 8 inch centrifugal pump in the basement, operated by push button control from the beater room. The capacity of the pump is about 800 G.P.M. A header runs the entire length of the beater room, with a branch to each beater. When stock is required, the beater man starts the pump motor; stock flows from the chest into the pump, which propels it into the beater. When the proper amount of stock is in the tub, the pump is stopped. This type of operation means that the pumping period may be from a half minute up to not more than four or five minutes.

First of all, a standard Meyers-Mesco Consistency Regulator was installed on the raw sulphite system by the Merritt Engineering & Sales Company, Inc., of Lockport, N. Y. Later a second regulator was installed for handling ground wood. Referring to the accompanying illustration, a 3 inch sampling line was taken from the pump discharge line close to the pump. This extracts about 90 dry lbs. per minute from the pump discharge and conveys it to the sampling box in which is located the agitating element of the regulator. This stock then overflows directly into the chest from the sampling box. Water for regulation under control of the regulator passes through the water valve, thence into the pump suction connection. The pump effectively mixes the water and stock which then passes to the beaters as shown. As the pumping periods are intermittent, the regulator motor is connected in parallel with the pump motor and operates simultaneously with it. Therefore, the regulator operates only while the pump is running.

An inherent characteristic, which makes this regulator of great assistance to centrifugal pump operation, particularly as regards starting with heavy stock, lies in the fact that with intermittent operation, at the instant of starting, the regulator valve opens wide for 4 or 5 seconds, then immediately closes down to the proper position for steady regulation. This affords a quick and healthy flushing of the suction line, pump casing and discharge line resulting in a great reduction of starting power and mechanical punishment at that time. As the same thing to the same degree occurs at every start, regulating accuracy during each pumping period is not affected.

For this intermittent type of service, the regulator is equipped with oil dash pots which effectively steady the water valve movements. Without them, there is a tendency for the regulator to hunt, but as the pumping period is so short, this cannot be allowed. The dash pots are eminently successful in obviating any hunting tendencies and allowing the device to do its best work without delay. In this unusually hard service, regulation must be established within a few seconds after starting and must cease by full valve closure instantly upon shutting down the pump.

Salient features concerning the Parker-Young installation are as follows: Handling up to 5.75 per cent raw unbleached sulphite; Regulating batch consistency in intermittent operation within .15 per cent of an average density; Instantly thrown in and out of action; No maintenance expense by its owners to date; Proven Reliability and accuracy; Negligible hunting due to intermittent operation; Improved starting conditions at pump; Constant running conditions at pump; Control of stock for processing and accounting greatly facilitated; Will do the same thing in any mill with any stock.

Unless your stockroom is round—

YOU NEED THIS NEW E-P TRUCK TO HELP LOAD THE CORNERS!

WHIPPET-LIKE, this new truck snaps in and out of narrow aisles and tight corners, delivering loads at exactly the right places and "snugging them up" as it leaves.

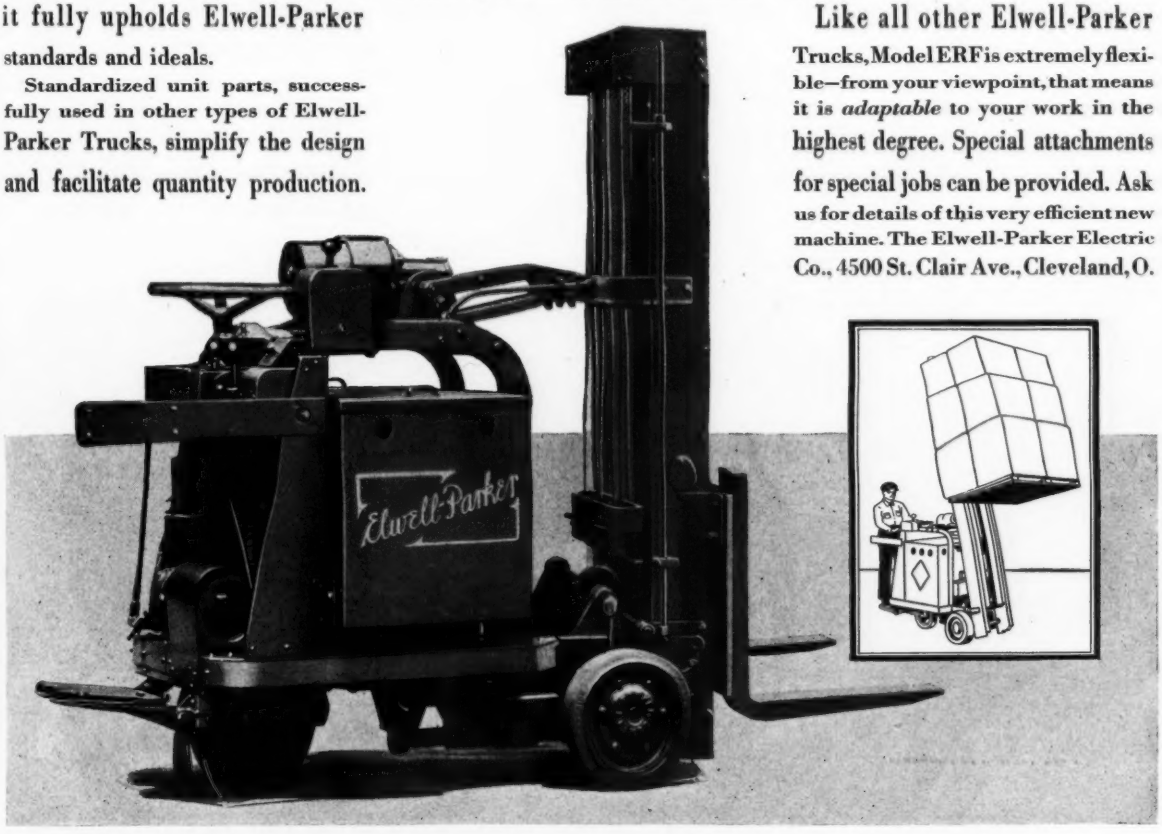
This is the Elwell-Parker Truck, Type ERF, with telescoping uprights, three-wheel, short swing, light duty, fork-type, developed to handle light, bulky commodities. It is the newest "Junior" in our complete line, and it fully upholds Elwell-Parker standards and ideals.

Standardized unit parts, successfully used in other types of Elwell-Parker Trucks, simplify the design and facilitate quantity production. All the Elwell-Parker safety features have been retained and additional comforts such as back rest, rubber pedal pads and wheel steer have been provided for the operator.

Probably the *most* important buying reason today is the fact that two years ago Elwell-Parker set its Engineering Staff to the task of developing new ideas in truck design, sounding out future needs in industrial production. We are now building these electric trucks—of which the ERF is one—that anticipate future conditions and make new economies in materials-moving *available today*.

The good faith of our Company is pledged in the statement that this latest development has brought to Elwell-Parker customers an even greater degree of forward-looking, money-saving improvement.

Like all other Elwell-Parker Trucks, Model ERF is extremely flexible—from your viewpoint, that means it is *adaptable* to your work in the highest degree. Special attachments for special jobs can be provided. Ask us for details of this very efficient new machine. The Elwell-Parker Electric Co., 4500 St. Clair Ave., Cleveland, O.



ELWELL-PARKER

DESIGNERS AND BUILDERS OF ELECTRIC INDUSTRIAL TRUCKS, TRACTORS AND CRANES FOR OVER A QUARTER CENTURY

New Building for Forest Products Laboratory

Six-Story Establishment to be Constructed by U. S. Forest Service at Madison, Wis., Will Be Largest and Most Complete Plant In World for Research on Wood—Equipment Will Include All Modern Scientific and Technical Facilities

CONSTRUCTION of the largest and most complete establishment in the world for research on wood will be started at Madison, Wis., shortly under a Government contract recently awarded. In the new building, equipped with modern scientific and technical facilities, the Forest Products Laboratory of the U. S. Forest Service will continue the work, initiated 21 years ago, to improve the production and broaden the uses of all classes of forest materials. C. B. Fritz & Co., of Madison, Wis., were the successful bidders on the building project. Holabird & Root, Chicago, are the architects. Davidson & Constable, Stamford, Conn., assisted in the landscaping design.

Better utilization of forest materials and broader markets for forest products are the objectives for which government research workers will use the new facilities. In its six stories, with total floor space of 175,000 square feet, the building will contain modern technical and scientific facilities for testing and investigating wood and other forest products in manifold uses and transformations, from logs, poles, and lumber to pulp, paper, and turpentine.

Dry Kiln Equipment

A large group of dry kilns equipped for close control of temperature, humidity, and air circulation will help to solve the problems of seasoning many species and types of wood. A cold storage chamber will be provided in which green logs and timber can be kept in unchanged condition for experimental work at any time.

Since every step of wood manufacture and construction and the satisfactory performance of wood in service are influenced by moisture conditions, a number of humidity rooms will be provided in which wood can be brought to the exact moisture content desired for study under conditions simulating any season of the year or any climate of the temperate zone.

Timber and Pulping Research

Machines for testing timbers and frame work up to a breaking load of 1,000,000 pounds will be served by cranes in a testing gallery accommodating pieces and panels as large as 30 feet high and 100 feet long. Tests of boxes and shipping crates can be carried on at any degree of dryness or dampness that would be met in service by storing and testing the containers in a special moisture-control room served by movable machinery.

The pulp and paper research laboratory, occupying six floors at one end of the building, will include grinder equipment, a digester tower 40 feet square, beating and refining apparatus, and an experimental paper machine with all moving parts under precision control. With this equipment the study of various American woods as pulp and paper raw material will be continued, along lines that have already broadened the pulpwood market and pointed the way to improved chemical pulping.

X-Ray Room for Wood

Among unusual features of the building will be an ultraviolet ray chamber, where wood can be sterilized for mycological studies and where paints and other materials can be exposed for test, an X-ray room providing for the examination of the minute structure and growth characteristic of wood, a microphotographic studio, and a stone table and shaft for ultracentrifuge apparatus to determine molecular sizes of cellulose and other wood components.

PROPOSED NEW STRUCTURE FOR THE FOREST PRODUCTS LABORATORY AT MADISON, WIS.

EASTWOOD

FOURDRINIER, CYLINDER AND WASHER

WIRES AND

STANDARD AND SPECIAL ALLOY

VALVES

FOR PULP AND PAPER MILLS

Continuous research and improvement of Eastwood "Perfection" Valves and Wires makes them of even more value and service today than at any previous time in our history of over 50 years.

EASTWOOD CORPORATION

At Belleville, N. J., since 1877

Provision is made for a large timber preservation laboratory, a wood fermentation unit, fractionating stills, a general section of wood chemistry, wood gluing, painting, finishing, and fireproofing laboratories, and facilities for the study of wood fungi and insect pests and the abatement of their damages.

Modern Service Facilities

To serve this establishment, extensive equipment will be required, including a railway siding, a power plant of 630 boiler hp., and a number of service elevators, hoists, and monorails. Direct and alternating electric current at various voltages will be supplied to work rooms, and steam at high and low pressures will be piped to processing apparatus. Chemists' benches will be supplied with water, gas, compressed air, steam, and electricity. A forced ventilation system will be used for chemical hoods, pulp digesters, and other units as required.

A sawmill, planers, and complete wood working shop will prepare test material in all sizes, shapes, and forms of construction needed, while wood for experimental pulping and paper making will be prepared in a room equipped for barking, chipping, and grinding.

To Make Forests Profitable

The Forest Products Laboratory is part of the Forest Service, U. S. Department of Agriculture, which administers the country's greatest reserve of timber, the national forests. "Forestry is concerned not only with timber growing, but also with the efficient use and profitable marketing of forest crops," states Carlile P. Winslow, director of the Laboratory, in explaining the purposes of the new building.

"The perpetuation of our forests and the reforestation of otherwise idle land largely depend upon the degree to which trees can be profitably converted into useful commodities. Consumption of lumber, for example, is increasingly a matter of competition of other materials, and problems of diminishing use have perplexed the lumber industry and tended to discourage reforestation. Profitable use of our forests must be the keynote of forest growing in the future.

Building Aids Increased Work

"Success in the economic restoration of idle forest and submarginal agricultural lands demands the development of new uses for wood to replace those captured by other materials, the modernizing of existing wood uses, and the adaptation of wood to complex and changing requirements.

"The Laboratory will increasingly contribute to these ends through the improved facilities for physical, mechanical, chemical, and biological research on wood and other forest products which the new building will afford. The work carried on for several years past by the staff of nearly 200 has taxed available facilities, and since Congress has already authorized the doubling of the annual operating appropriation, the need for new and larger quarters is imperative."

Cooperation with University

Since the Forest Products Laboratory was opened by the U. S. Department of Agriculture, in 1910, it has occupied buildings owned by the University of Wisconsin. This assistance is based on the original cooperative arrangement whereby the Laboratory is available to the university faculty and advanced students for research, and its staff gives lectures in the university on wood chemistry and technology and other subjects related to forest utilization.

The university board of regents has aided the new building project by donating a choice site of 10 acres overlooking Lake Mendota and the university campus.

In general plan the new building will be U-shaped, about 275 feet in length and over-all breadth. It is of modern design, emphasizing "stepped-back" construction, vertical lines, and large areas of glass in the external walls. By terms of the Congressional authorization act, the building will be of fireproof construction throughout.

The modern spirit which dominates the design has discarded outworn symbolism, according to the architects, who gave the following comments on their plans:

"The architectural conception of the building is essentially modern in its effort to achieve, through the massing of the required utilitarian elements of the structure and through the treatment of the preponderant surfaces of glass, a classical and balanced whole suitable to the dominating site. This is an attempt at the true classical feeling through the natural dictates of the problem, rather than through the use of obsolete forms and expensive decorative elements. If this effort is successful, it will have been achieved in a logical manner and with a minimum of expense."

Amalgamated to Build New Plant

[FROM OUR REGULAR CORRESPONDENT]

FORT EDWARD, N. Y., October 24, 1931—The Amalgamated Paper Company plans to receive bids this week for the contract relative to the construction of its new plant addition, and excavation work is expected to be under way within a few days. An increasing demand for school tablets and other products from all sections of the country have made it imperative that more manufacturing space be obtained. The company plans to furnish all materials needed for the building of the annex and is seeking bids for the cost of the labor only.

The company erected its present plant in this village about two years ago but maintains its principal offices in New York City. The increased volume of business has necessitated day and night schedules for some time past and the placing of the new addition in operation is expected to relieve congested conditions. The company prefers to operate on normal schedules and feels that the night work imposes a certain amount of strain on its employees. The new building is expected to result in the doubling of the working force and the elimination of the night shift.

Paper-Making in the Classroom

Manual Arts Press, of Peoria, Ill., have just published an eighty page book entitled "Paper-Making in the Classroom," which explains in detail just how paper is made by the hand process and how it may be made in the schools. It gives the novice an insight into the art of forming sheets of paper by hand, using only simple and inexpensive equipment. The author, Dard Hunter, is a practical paper-maker as well as a high authority on the history of paper-making.

The early part of the book is devoted to the history of writing materials, beginning with the use of stone by the Egyptians, bricks by the Chaldeans, brass, copper, bronze, and lead by the Romans, wood by the early Greeks, etc., down to the manufacture and use of paper by the Chinese in 105 A. D.

The book will find a place in public libraries, museum libraries, technical libraries, printing departments of public schools, and also in the libraries of paper manufacturing companies. The price of the book is $1.35 per copy, post-paid.

Over 40 years Experience is behind Appleton Felts ----It's an experience you can use on your Felt Problems

Just as paper making processes have changed, developed and improved, so have Appleton Felts and Jackets kept abreast of this progress and today are standard for design, quality and service.

Appleton Felts and Jackets are made for the definite requirements of the customer so that today our customers look upon the Appleton trade mark as their guarantee of quality and service.

APPLETON WOOLEN MILLS

Appleton, Wisconsin

Write us anytime

Appleton

Felts and Jackets

A Practical Bandless Beater Roll*

By J. D. Haskell[1]

Inasmuch as "Your Paper is Made in Your Beaters," it is fitting that a paper of this kind should treat with the beater roll because after all, the roll is the heart of every beater. And while to us, bandless beater rolls are taken as a matter of fact, it is still surprising to find every now and then, a paper mill superintendent who has never heard of one. In any event, a brief explanation of our bandless roll might prove of interest and fit into a program of this kind.

Historical Résumé

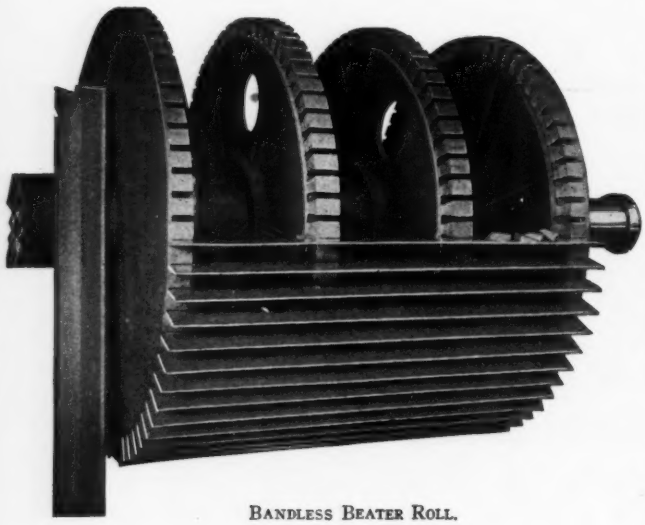
At this point a brief historical résumé might be of interest. In 1905 our shop superintendent, Mort Rust, who carried all the battle scars of genius between his ears, was grousing around the beater room of a felt mill next door to our plant. In those days the banded beater roll, in which all the bars were held in place by iron bands shrunk over the ears of the fly bars, was the sore spot in every roofing felt mill because of the severe service required and it was a common thing to have a beater roll blow up and throw fly bars and wood filling all over the place. This is exactly what happened during Mort's visit on this particular day, and one of the bars sailed over his head and embedded itself several inches into a brick wall behind him.

And right there an idea was born. Mort came back to the shop and went into a huddle with himself, out of which developed the first practical bandless beater roll. In the first design of roll the bars were punched with round or oblong slots which engage with corresponding lugs on the spiders or heads. Then a specially developed babbitt metal was poured into the remaining space in the slot and the bars thus securely fastened in place.

While this roll overcame completely the troubles caused by broken bands and the resulting dangers and loss of production during the life of the fly bars, it did have the rather objectionable feature of presenting a problem when refilling became necessary. In the larger mills such as Philip Carey's where fifty or more of these rolls were used this problem was minimized by the development of a crew of workmen who became experts at melting out the babbitt and refilling these rolls. In fact, some of these crews could do the job more quickly than our own men. But in the smaller mills where refillings were less frequent, it was considered a real chore to strip and refill one of these old style babbitted rolls.

* Paper presented at the Fall Meeting of the Northern New York Division of the American Pulp and Paper Mill Superintendents Association, Oct. 17, 1931.

[1] Sec., Dilts Machine Works, Inc., Fulton, N. Y.



BANDLESS BEATER ROLL.

Keyed Bandless Roll

So in 1919 Mr. Rust again went at the problem and brought out the keyed bandless roll which, in a very much improved form, we are building today. This roll is made up with four cast steel heads—four of them—and each head is provided with dovetail slots which permit each fly bar to be held securely in each head by means of metal keys or wedges. This model will serve to illustrate this construction.

In this construction it is possible to remove one or more broken fly bars without disturbing the others. It is only necessary to remove one section of wood filling between the bars which exposes the keys or wedges and a drift is then employed to drive out each key. The holes in the outside heads give access to the keys for these heads and of course, the design of the inside heads leaves the end of the keys accessible for drifting. After one fly bar is removed the wood filling between that bar and the next will fall out, exposing another row of keys—and so on.

Filling the Roll

In filling our keyed bandless roll we put each fly bar loosely in place, driving each key only hard enough to prevent it falling out as the roll is turned over. Then a special square faced sledge is used to sledge the keys into place. This is done a little at a time all the way around the roll which equalizes the strains on the spiders or heads. We usually drive these keys to within ¼ inch of "home" during this sledging operation and then a heavy bar drift about six feet long is used to drift the keys "home." Unless you have actually seen this done in our shop, you cannot appreciate how tightly these keys are driven.

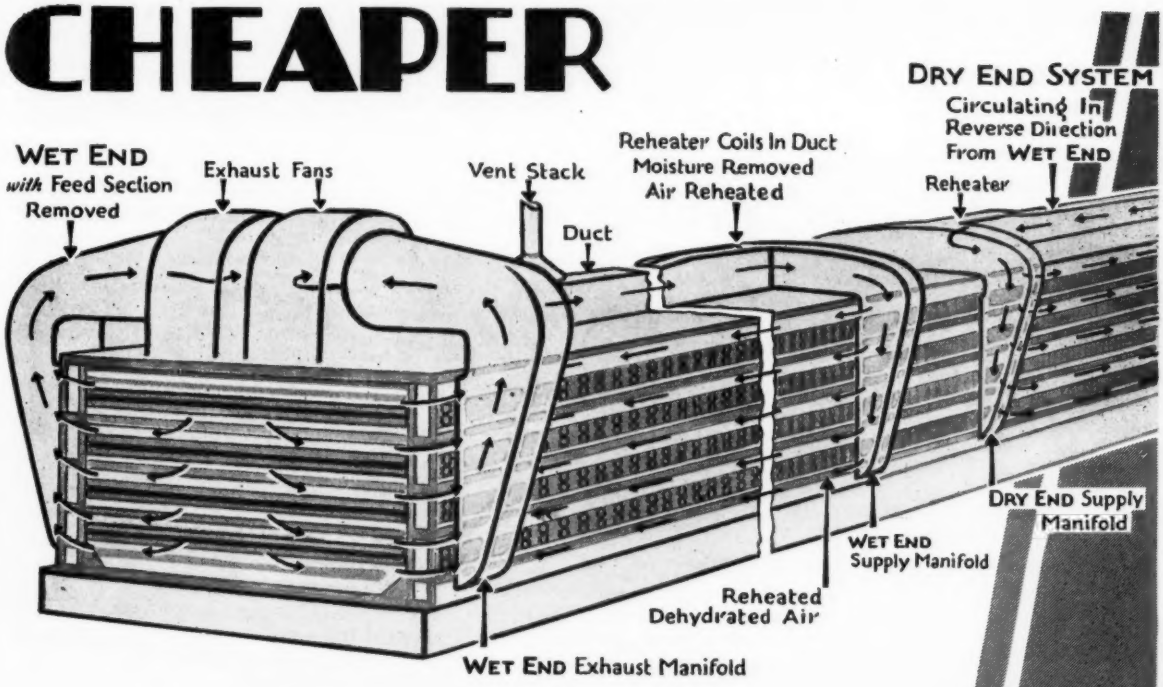
You might think it would be difficult to drive the keys out after they had been driven so tightly, but you will note that the slots are made tapering so that the keys are tightened all the way in, and likewise when they are removed it is only necessary to start them with a drift and they can then be driven out readily with a machinist's hammer. Also we dip the keys in white lead before driving and in some cases we employ manganese bronze keys.

After the bars are securely in place the wood filling is driven. The woods are made in two pieces, one piece locking under the fly bar and the other piece made wedge shaped for a driving fit. After the woods are driven down even with the top of the heads, drive screws are driven into the crack between the woods to insure added bond. Then the usual cap pieces are fastened over the sectional filling.

Better Quality of Steel for Fly Bar

Along with the development of this bandless roll it became necessary to develop a better quality of steel for the fly bars. The development of the automobile gave great impetus to the development of alloy steels and up

CHEAPER



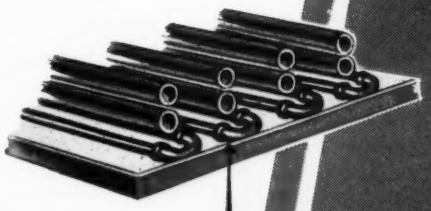
BOARD DRYING

IMPORTANT among the many reasons for Coe Board Dryer supremacy, is the fact that the advanced drying principles embodied provide maximum drying efficiency with a minimum of heat consumption or loss.

The above diagram shows in part the provision for circulation and re-circulation of the drying medium. Note that the drying medium, whether hot air or steam, is evenly distributed both above and below every board passing through the rolls of each deck.

An accurately calculated system of fans, air ducts and reheaters, designed according to the requirements of the board, all carefully insulated, makes possible the rapid and thorough, yet economical, drying for which the Coe Dryer is deservedly noted.

Write for further information and details of Coe experimental laboratory service for aiding in the development of new boards—no obligation involved.



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Address

P. T. J.

The COE MANUFACTURING CO.

432 BANK ST., PAINESVILLE, OHIO

to that time almost any low carbon steel was used in fly bars.

Having solved the problem of holding the bars in the beater roll, we turned our attention to the development of an alloy steel suitable for fly bar service and we took up this important question with several of the largest manufacturers of steel and explained to them that we required a fly bar which would have to be hard enough to withstand mild shocks without bending and would also wear down without losing the effectiveness of its cutting edge and at the same time a steel which would bend under extreme shock rather than break off and do damage to the other bars in the roll. After considerable research it was found that vanadium alloy steel filled the necessary qualifications and represented a big advance in this field.

However, since vanadium alloy was a synthetic product, it was found difficult to control the correct amount of vanadium and while in most cases this steel proved satisfactory, there were instances where the vanadium became segregated in a relatively few fly bars and this made the bars extremely brittle even after careful heat treatment.

Better Grade of Manganese Alloy

We worked constantly with several steel companies who recognized the importance and large tonnage to be expected in this field and later chrome alloys and chrome nickle steels were perfected and proved highly satisfactory as a material for fly bars. Lately, however, we have developed even a better grade of manganese alloy for bars which we feel is far superior to anything obtainable to date.

Test Every Bar for Hardness

Of course, in order to utilize alloy steels for fly bars it was necessary for us to install complete heat treating equipment and institute careful recording of hardness tests, the temperatures used in the furnaces and lead tanks and keep after the steel companies constantly to insure getting a steel of uniform quality. We keep a record of heat treated fly bars we make and test every bar in a set for hardness on a Brinnel testing machine which we check frequently with scleroscope and Rockwell testers. The records are kept on file so that at any future time the fly bars can be made harder or softer to suit the needs of the customer.

We do not recommend the use of hardened steel fly bars for banded rolls since the bar is so much harder than the iron bands used to hold them and there is danger of the bars cutting or chafing into the bands which causes the fly bar to loosen and subsequently either break out or cause the bands to break.

Furnished in Any Shape or Style

The keyed bandless roll which we have endeavored to describe is adapted to use fly bars of any required hardness and can be furnished in any style or shape. We also furnish the bars with a corrugated cutting edge in either alloy or carbon steel and we have our own electro-plating and tin coating plant so that we are in position to furnish copper coated or tin coated fly bars.

Over One Thousand in Operation

We have endeavored as briefly as possible to outline the development in the field of beater rolls and we feel that having over a thousand of these rolls in operation in paper mills all over the world is ample proof that the bandless beater roll represents a real contribution to the paper industry.

New York Trade Jottings

George W. Houk, executive vice-president of the Hawley Pulp and Paper Company, Oregon City, is visiting New York this week in the interest of his organization.

* * *

Neypaco Paper Corporation, of Brooklyn, N. Y., has been chartered under the laws of the State of New York with a capital stock of $20,000. H. Stohldreuer, of White Plains, N. Y., was the attorney.

* * *

R. S. Kellogg, secretary of the News Print Service Bureau, with offices at 342 Madison Avenue, New York, has returned to his desk after an extended business trip, during which he visited Quebec, Montreal, Chicago and Wisconsin.

* * *

The Davey Company, manufacturers of binder board, of Bloomfield, N. J., entertained members of the Bookbinders' Guild of New York last Saturday. Following luncheon the visitors inspected the modern and efficient plant of the company.

* * *

Ignaz Serog, president and general manager of the Saybusch Paper Manufacturing Company, of 15 East 40th street, New York, sailed for Europe on Monday evening, October 26, abroad the North German Lloyd steamer *Bremen*. He will return to Zywiec, Poland, where the extensive mills of the company have been located since 1889.

* * *

The Permutit Company, of 440 Fourth Avenue, New York, announces that Francis D. West has returned to the staff as district sales manager, with headquarters at 712 Brisbane Building, Buffalo, N. Y., after spending about a year and three-quarters with the Paradon Company as manager of sales. Mr. West was associated with the Permutit Company from 1918 until 1930 and has had a very broad experience in the treatment of industrial water supplies.

* * *

The Waste Institute has been invited by the paper board group of the Paperboard Industries Association to appoint a committee to meet with a committee representing that association on November 17 for the purpose of considering the advisability of drawing up a standard classification covering waste paper and if agreeable to both committees to draw up such a classification. The Paperboard Industries Association will be holding meetings in New York on November 17 and the Waste Paper Institute's plans call for a meeting of the executive committee on the 16th, a conference with the Paperboard Industries Classification Committee on the 17th and a general meeting of the Institute on the 18th.

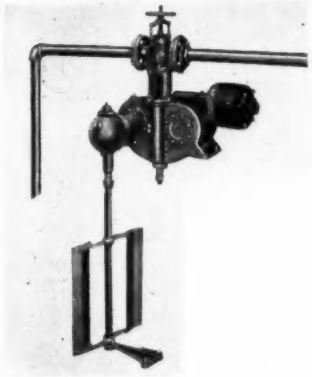
* * *

The largest attendance of the season turned out for the regular weekly luncheon and meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, which was held on Tuesday at George's Restaurant, New York, to hear E. W. Palmer, president of the Kingsport Press, discuss the problem of paper from the point of view of the book publisher. Mr. Palmer spoke of the better understanding shown today between manufacturers and publishers in each others problems. He stressed the importance of research in this Era. Mr. Palmer's instructive and interesting address was thoroughly appreciated by all present and he was accorded a hearty vote of thanks. Next Tuesday being Election Day, the usual meeting and luncheon will not be held.

MEYERS-MESCO
STOCK CONSISTENCY CONTROLS

The advantage of automatically controlling stock consistency, should be perfectly obvious. Beater chests dumped under human control are bound to cause density variations which make uniform board or sheets an impossibility and a product without uniformity is a drug on the market.

Reliable production, smoothness of operation and general satisfaction throughout the mill are natural results of substituting automatic for manual regulation. Uniformity of stock condition, especially ahead of the Jordans, stimulates uniform action of the entire web forming process.



THE "IRON HAND" CONSISTENCY REGULATOR

promptly and automatically controls paper and board stock consistency with a constancy and precision that cannot be approached by the human hand. It will operate on stock not lighter than 2.5% and not heavier than 7%. It has proven itself capable of handling a wide range of stocks from tissue to insulation board, including condensor papers, rope stock and raw sulphite, unbeaten and unbleached.

It tackles jobs that are difficult and problems that are unusual and succeeds where other regulators fail.

It corrects variation at the source before the board or sheet is formed.

It functions in the whole body of fluid stock and avoids the danger of dealing with so-called samples arbitrarily taken from the supply.

BULLETIN NO. 3105

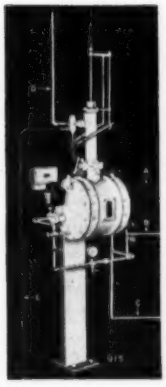
MODEL C
AUTOMATIC WATER FEEDER for BREAKER BEATERS

AUTOMATIC ADMISSION OF WATER to the tub of a continuous or batch beater is now an accomplished fact and offers another striking example of what can be gained by doing automatically what has heretofore been done by hand.

BY SUBSTITUTING CLOCK WORK, which is accurate and reliable, for guess work, which is inaccurate and unreliable, an automatic control may easily simplify a whole process and standardize a product, at the same time it saves labor and reduces cost.

BY THE AUTOMATIC ADDITION OF WATER, THIS DEVICE will convert slush stock of varying density to uniform consistency and it will control the defibering of dry stock to any final density for which the instrument is set. The action is the same regardless of the type of raw material being fed.

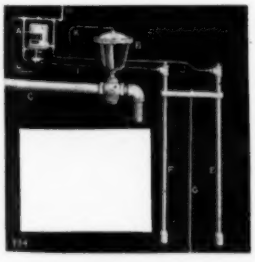
BULLETIN NO. 3101



BEATER STOCK RECORDER

is a highly sensitive air operated device which, by means of two recording pens, indicates and records on charts, hydraulic levels at two given points within the tub. It gives a complete history of the beating cycle. It shows: When the operation began. When it should end. When fresh material was added. Changes in freeness. The time, duration and magnitude of any change of conditions in the tub.

BULLETIN NO. 3104



MODEL B
AUTOMATIC WATER FEEDER FOR BATCH BEATERS

will admit the proper amount of water to your batch beaters to bring them to the best beating consistency for the product to be made. It will do this without attention by your beatermen so that the density of stock in a beater this morning will be the same as a beater made a week ago.

BULLETIN NO. 3103

MERRITT ENGINEERING & SALES CO.
LOCKPORT, N. Y.

PAPER TRADE JOURNAL

ESTABLISHED 1872

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THE MILL NUMBER

This eighth Annual Mill Number of the PAPER TRADE JOURNAL is designed as usual to furnish by means of numerous articles and illustrations a cross-section of the progress registered during the past year in the pulp and paper industry of the country. The text matter is well supplemented in this respect by the advertising section, which contains announcements of various new machines, methods and supplies which are bound in the immediate future to play an important part in the art of pulp and paper making as practiced by the most progressive concerns. These announcements deserve careful reading as they contain much information of decided value to mill executives who care to keep thoroughly informed on the latest developments in pulp and paper manufacture.

New construction during the past year, naturally, has not been active. Perhaps the most outstanding mill to go into operation during this period is that of the Southern Kraft Corporation at Panama City, Fla., which is said to be the largest plant of its kind in the world. Another noteworthy mill to come into existence this year is that of the Weyerhaeuser Timber Company at Longview, Wash. This great mill, equipped along the most modern lines, has six digesters and has a capacity of 350,000 pounds of sulphite pulp daily. It is expected that it will be in commercial operation in the very near future.

While the construction of new mills has obviously lagged, especially as compared with the record of recent years, improvements to going mills of a more or less extensive character have been numerous. In many cases it is interesting to observe that these improvements have been undertaken not with the purpose of increasing the capacity of the plant, but with the aim in view of producing better paper at lower cost. Many particularly interesting instances of this kind are described elsewhere in this issue.

Judging from this Mill Number, it will perhaps be accepting no great hazard to guess that new pulp and paper mill ventures will not be undertaken so plentifully in the near future as they have been in the recent past. It is, however, by no means discouraging to face this fact. It may, on the other hand, be a matter of satisfaction to the industry in general to appreciate that the ferment of expansion which marked the past few years is apparently less operative than it has been and is not likely to manifest itself so intensely again soon. The stabilization of the industry has been much desired for some time past and under the influences now at work, it is probable that this will be effected before long in a manner to meet with general approval.

In the new phase into which the industry is entering, the matter of obsolescence will be certain to be given much more attention than ever before. This means that machinery that has out-lived its usefulness, that does not make good pulp or paper at a low cost, will be discarded and replaced with efficient equipment with less reluctance than formerly. Mills in the future must be up to date. They must be run efficiently. In the future, much more than in the past, will it be appreciated that only such plants can hope to make a satisfactory profit on the capital invested in the enterprise.

Fortunately, as may be judged from this Mill Number, there are numerous men in the paper field of sufficient broad vision to appreciate this new condition of things and it is confidently predicted that the men in the industry in general will not hesitate long in following this leadership as the needs arise to make their mills meet every requirement, not only to make good paper, but to make it at a low cost.

As regards the immediate future of the industry, it is inspiring to point to the action of the Champion Fibre Company of Canton, N. C., allied company of the great Champion Coated Paper Company of Hamilton, Ohio, which has just placed an order with the Pusey & Jones Corporation of Wilmington, Del., for a 242-inch Fourdrinier capable of turning out 300,000 pounds daily of book paper. This improvement will aggregate an investment on its completion it is estimated of $1,500,000. This action speaks for itself. Its sponsors are among the most experienced in the paper making field.

Turning to Canada, a superficial survey of the situation there may easily lead to quite unwarranted pessimism regarding the outlook, for while it is true that there has been little new construction work during the past year, there is no doubt whatever that the pulp and paper industry is entering upon a period of rehabilitation and reconstruction. In this connection it should not be overlooked that current figures relating to production as compared with installed capacity do not present a true picture of the condition of the industry. As a matter of

fact, the aggregate production has kept up surprisingly well. For instance, Government returns covering the industry for 1930 show that there were 81 mills manufacturing pulp and 77 mills making paper in Canada. The latter produced 2,926,787 tons of paper, 85.3 per cent being news print. This compared with the all-time record of 3,197,149 tons in 1929, the falling off from that peak year being only 270,362 tons. There has been a further, but still very moderate, decline in the present year. Thus for the first eight months of 1931 the Canadian output of news print alone is officially put at 1,484,823 tons, which is approximately equal to Canada's production for the entire twelve months no farther back than 1925, while the export of various kinds of pulp was not far short of half a million tons. The total capital investment of the industry as a whole, according to the 1930 figures, was $714,437,104. The gross production for the year was valued at $215,674,264.

These figures represent the sum of the values of pulp and paper made for domestic use and export. They do not include pulpwood nor the pulp made in combined pulp and paper mills for their own use in making paper. Workers directly dependent on the industry for their livelihood numbered 33,584 and the amount paid out in salaries and wages totalled $50,214,000. It will thus be seen that the industry is a gigantic one, and that in point of production it has been holding its ground during the depression far better than many other industries, and far better than the figures of production in comparison with installed capacity would suggest.

A point to which particular attention is drawn is the fact that while the depression lowered demand at the very time when large expansion projects, initiated in view of constant increasing demand, were nearing completion, and while prices have suffered in consequence, these very factors are forcing serious consideration of a plant reconstruction policy in respect to the older news print mills. Conditions have brought the managements sharply up against the necessity of cutting down costs, and in considering this matter it is quite evident that a substantial proportion of the present idle machinery can never again be put into profitable production. Statistics on operation show that news print mills in Canada have of late been operating at but little over 50 per cent of capacity, but this is true only in the sense that the rated capacity represents potential capacity and not profitable capacity. At present prices it has been estimated that only about half the installed capacity can be profitably employed. This may or may not be approximately correct, but that a very large proportion could not be operated profitably at the present selling price of news print is generally admitted. When demand improves no responsible executive will put high-cost, obsolescent machinery into use. Old machines will have to go, to make way for new equipment that will keep costs down to a minimum, especially as news print prices seem likely to remain constant around the present level over a long period.

Even at the present moment, forward-looking executives of various mills are reconditioning equipment and installing new labor-saving machinery, and as the financial reorganization of the industry to meet new conditions is now well towards completion, this movement for rehabilitation and modernizing of equipment will be the next to receive general consideration. Perhaps the most notable instance of this movement is provided by the Powell River Company, one of the earliest operators in British Columbia. With machines that had grown old in service and faced with the necessity of lowering costs to advance its position in the Western news print trade, this company is now bringing to a conclusion a programme of reconstruction that has involved the expenditure of several millions of dollars. There is every reason to believe that action such as this will be followed in Quebec and Ontario, and that the period is fast approaching when the news print industry will again see the outlay of large capital sums in the interests of economical and profitable production.

Empire State Reforestation Discussed

[FROM OUR REGULAR CORRESPONDENT]

SYRACUSE, N. Y. October 24, 1931—The criticism of the reforestation amendment to be voted on at the coming election by Former Governor Alfred E. Smith brought a reply from State Senator Charles J. Hewitt at a meeting of the State Reforestation Commission held this week at the College of Forestry, Syracuse University. Senator Hewitt defended the proposal up for referendum and vigorously denied the former executive's charge that it would give the timber belonging to the state to the paper manufacturers and lumber kings. Mr. Smith is urging voters to oppose the amendment which has the support of state officials.

Senator Hewitt declared that experience of the past few years has proven that the idle land in the state will never be reforested by private enterprise and that the proposed amendment will benefit all sections of the state by providing watershed protection for centers of population as well as improving the water supply for rural regions. He also emphasized the recreational advantages to be derived from the reforested areas and asserted that would be the chief function for many years. He also declared that the amendment prohibits the cutting of timber on land owned or hereafter acquired by the state within the Adirondack and Catskill preserves.

Dr. Hugh P. Baker, dean of the forestry college, and other member of the commission, refused to comment on the statement made on the amendment by the former state official.

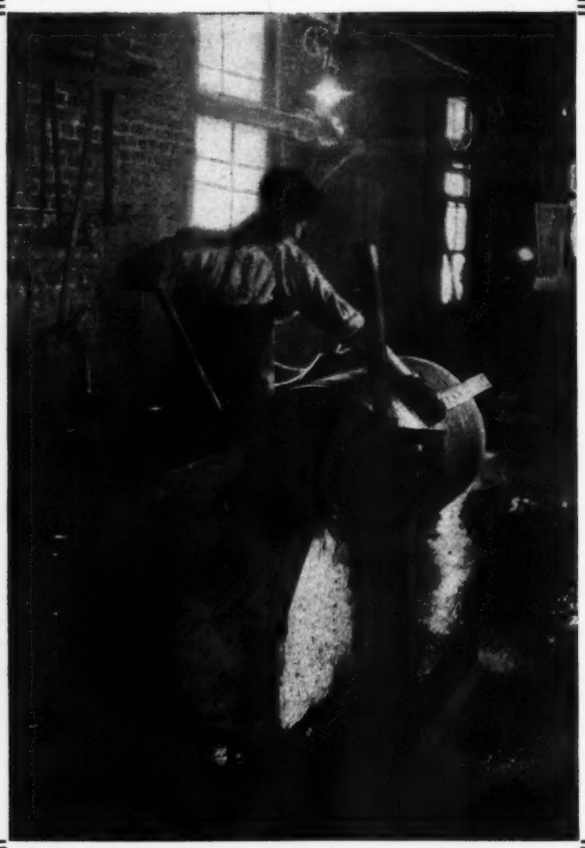
New Pulp Testing Device Patented

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., October 24, 1931—Frank M. Williams, president of the Williams Apparatus Company, has been granted a patent by the government on a new invention which is claimed to have a number of patentable features. The invention is a device that determines the freeness of paper pulp and embodies a container for a sample of pulp to be tested with a screen through which the pulp is discharged and another container to receive the tested. His claim for a patent was filed during the month of May, 1927.

CONTRIBUTING TO EBG QUALITY

Every possible effort is maintained, in the extensive EBG plant at Niagara Falls, to keep intact the high standards of manufacture and service which have made EBG Liquid Chlorine a favored product for many industries.



Cleaning the diaphragm of the cathodes: a part of the cell-rebuilding which is EBG's continuous maintenance problem.

For instance, each chlorine cell in this plant is torn down and completely rebuilt, on an average of every five months. The picture shows one of the steps in this tireless effort to keep production on a high plane . . . to deserve the EBG reputation.

ELECTRO BLEACHING GAS CO.

Pioneer Manufacturers of Liquid Chlorine

Main Office: 9 E. 41st St., New York, N. Y. Plant: Niagara Falls, N. Y.

EBG

Liquid Chlorine

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Air Conditioning in the Paper Industry*

By W. G. Schlichting[1]

Air conditioning although a relatively modern art, and having its inception within this century hardly needs an introduction to the paper industry, as it was in this industry and the closely allied printing field that the highly specialized and developed art of air conditioning had its early beginning.

Briefly the object of this paper will be to discuss—

The effect of variations in atmospheric conditions on paper.

The necessity for air conditioning in press rooms and the temperatures and humidities which should be maintained.

The necessity of co-operation between the paper maker, printer, lithographer and air conditioning engineer to the end of establishing standard operating conditions in all press rooms.

The necessity for a constant temperature and humidity room in every paper mill laboratory and a description of the equipment required and results which may be expected.

Paper being a hygroscopic material gives up or will absorb moisture very readily depending upon the relative humidity of the air with which it happens to come in contact. The individual fibers swell more in diameter than they do in length upon the absorption of moisture causing the sheet to increase or stretch in width (the direction perpendicular to the fibers) a greater amount than the increase in length or the direction parallel to the fibers. Further, the amount of moisture which paper will absorb varies proportionately as the relative humidity of the surrounding air and, therefore, the dimensions of a sheet will vary in the same manner.

Paper stacked in a pile under heavy pressure provides no means for air to reach the center of the pile with the result that if the relative humidity of the surrounding air varies, the exposed outside edges will either absorb or give up moisture causing wavy edges in the first case and a bulge in the center in the latter. Both of these result in press feeding difficulties and the bulky sheets may cause creasing of the paper as it passes through the press.

Printing Difficulties

In unconditioned press rooms, most of the difficulties are experienced during periods of winter operation during which time the relative humidity may vary as much as 60 per cent from as low as 5 per cent to 65 per cent and as much as half this amount in a day. Briefly then, winter difficulties in the unconditioned press room are experienced due to lack of sufficient humidity. During summer the humidity may vary 70 per cent from 20 to 90 per cent, but due to the higher range less trouble is experienced.

Changes in sheet size cause improper register with its accompanying costly delays in waiting for the proper day and humidity. The evils due to wavy edges and bulged sheets from stacking in piles have been previously pointed out and to eliminate these many printers have installed pre-conditioners in which paper going to the press is hung up and allowed to season in the press room for a certain period.

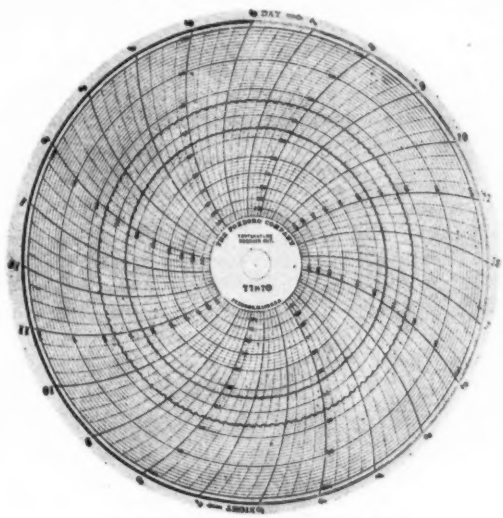
Ink will tend to spread and dry too slowly on papers having too high a moisture content while on dry paper the ink will penetrate too deeply.

Rollers, also react to changes in relative humidity, increasing in diameter and riding the form and resulting in dirty jobs unless frequent adjustments are made. Rollers also do not properly ink the plates if the relative humidity is too high.

Static electricity, experienced with too dry air, is generated by the friction of the paper passing through the press and causes sheets to adhere to each other causing offset at the delivery end, unless slip sheets are employed. Maintaining a relative humidity of 45 per cent or over eliminates static electricity without the aid of neutralizers, and permits faster press speeds.

Press Room Conditions

Another asset experienced with a conditioned press room al-



WET AND DRY BULB RECORDINGS

* Presented at the fall meeting of the Technical Association of the Pulp and Paper Industry, Kalamazoo, Mich., Sept. 24-26, 1931.
Contribution of the Equipment Committee.

[1] Clarage Fan Company, Kalamazoo, Mich.

though known to exist in a more or less intangible form, is the increased production due to the effect of more comfortable and healthful working conditions for the press room operators. Absence due to sickness and labor turn over has been shown to be reduced to a minimum.

Thus it will be seen that the humidity in a press room should be maintained at a constant value, and since temperatures have little or no effect on paper and press room operation except so far as keeping the ink between 70 and 80 deg. F. for best flowing, that the temperature may be raised above the winter setting somewhat during the summer months for economies in operation of the dehumidifying equipment. Best results have been experienced with temperatures between 70 to 75 deg. F. and corresponding relative humidities of 45 to 50 per cent.

On the preceding page, chart shows the wet and dry bulb recordings in conditioned press room for a twenty-four hour day. Note the even and uniform control and the temperature variation of not more than ½ deg. F. with a corresponding variation of relative humidity of about 2 per cent.

Conditioning in press rooms is not sufficient in itself and there is a great need for standardization as to temperatures and humidities in all press rooms. Paper makers give a great deal of attention to the weight of paper leaving the machine and very little attention to the urgent need for conditioning the paper from the very minute it leaves the machine, through the calender, finishing and storage rooms, to the actual delivering of the paper to the printer. In this manner all paper could be maintained at the same relative humidity until a finished produce and annoyances from paper distortions eliminated providing a final standard press room condition was agreed upon.

Physical Testing

Recently there has been considerable interest and tendency toward exact measurements and testing of the physical characteristics of pulp and paper with the result that constant temperature and humidity rooms have been installed in paper mill laboratories and those of manufacturers of supplies for the various paper makers. These rooms may be provided at a very nominal cost and the equipment required may be of very compact design and at the same time provide very exact temperature and humidity conditions in the conditioned space. A room of this type has recently been installed in the plant of a well known chemical supply company which has been performing with complete satisfaction.

The inside dimensions of the room measured approximately 9 feet x 10 feet x 9 feet high, properly insulated on side walls and ceiling and access to the room is gained through double doors and a vestibule. The benches are arranged on two walls and carry the required testing apparatus. The room is air conditioned by means of a vertical type unit air conditioner completely assembled, constructed of galvanized iron properly reinforced containing tank, spray system, water heater for winter humidity control, eliminator plates, reheater section, direct connected fan assembly, and cooling coil for producing the necessary refrigerated effect to the spray water. Access to the spray chamber of the unit is gained through a heavy cast iron access door provided with rubber gaskets and positive closing cams. Reheater and water heater sections are constructed of copper tubing, the reheater sections are of the extended fin type, both using steam for the heating medium.

There is provided in conjunction with this equipment, a compact refrigeration unit, using methyl chloride as the refrigerant, and which consists of a double cylinder compressor, double pipe condenser, receiver, V-belt drive and motor, all mounted on a common base. Connections to the copper direct expansion coils in the unit conditioner are made by means of copper tubing and automatic expansion valve and the necessary shut-off valves and gauges are included. During periods of summer operation, practically all air is recirculated, there being admitted to the room only such portions as are required under ventilation requirements, return air from the room passes up through the inlet box on the back of the unit into the unit and through the spray chamber and spray systems at which point it is saturated to a definite moisture content. From this point it passes through the eliminator plates where all entrained moisture is removed, then to the reheater section where heat is added providing the heat gain of the conditioned space is not sufficient to raise the air to the desired room dry bulb temperature. Air is introduced into the room through a series of ventura openings at the ceiling which are of the ejector type and which induce circulation of the room air. Return air is removed from the room through properly designed return air openings located at the floor level.

During periods of winter operation the manual dampers at the rear of the unit are reversed and fresh air is admitted to the unit for cooling purposes, eliminating the necessity for operation of the refrigeration equipment at this time. Only a slight amount of return air is used and the excess air delivered to the room is vented through a vent opening in the side wall provided with balanced vent dampers.

A complete system of temperature and humidity control is incorporated providing accurate control of temperature and humidity within the conditioned space with a maximum temperature variation of ½ deg. F. and a corresponding variation in relative humidity of not exceeding 2 per cent. Control of relative humidity is accomplished by means of a dewpoint thermostat located in the eliminator plates of the unit conditioner operating, during periods of summer operation, a diaphragm valve located in the water supply over the direct expansion coils in the unit conditioner allowing for the make-up of cold water for dehumidifying as required. During periods of winter operation this same thermostat operates a diaphragm valve located in the steam supply to the water heater section, heating the water for humidifying purposes. A room type thermostat is located in the room and controls the dry bulb temperature of this space by operating a diaphragm valve located in the steam supply to the reheater section. Thermometers and indicating instruments are provided at different points for checking the operation of the control apparatus.

The conditions maintained during periods of summer operation are the standard conditions of 70 deg. F. dry bulb and a relative humidity of 65 per cent. During periods of winter operation in which outside air is used for cooling purposes lower relative humidities may be used if desired for special testing and the relative humidity secured in this means will be dependent upon whether the outside wet bulb temperature is lower than the required dewpoint or saturation temperature of the equipment.

TAPPI Sections

The next meeting of the proposed Delaware Valley Section of the Technical Association will be held on November 12 at the Engineers Club in Philadelphia. Meetings will be held in the future on the second Thursday of each month. The November meeting will consider pulp testing in relation to foreign and domestic pulp. W. R. Maull, vice-president of Dill & Collins Company, Philadelphia, is chairman of the proposed section.

The Lake States Section of TAPPI met at the Hotel Menasha on October 13. Griswold Van Dyke of Joseph T. Ryerson & Sons, Inc., Chicago, Ill., was the speaker, taking for his subject, "Chrome and Chrome Nickel Alloys."

The Pacific Section of TAPPI met at Powell River on October 23. Members traveled by boat from Vancouver to Powell River, B. C. Among the papers presented were the following: "The Brobeck Sulphite Circulating System," by A. H. Lundberg. "The Ozone Treatment of Waste Sulphite Liquor," by H. W. Nightingale, Washington State Sanitary Engineer. "Saw Mill Waste," by J. H. Jenking of the Canadian Forest Products Laboratories at the University of British Columbia. The members inspected the Powell River Company paper mill and the Lois River power development. Banquet speakers included R. Bell-Irving, manager of the Powell River Company and Lawrence Killam.

Control of Relative Humidity in a Small Inclosed Space*

By F. T. Carson[1]

Abstract

In response to a demand for information about maintaining constant humidity in a small space, especially in a small cabinet in which some testing of paper can be done, a brief description is given of suitable apparatus, together with compilation of data for the preparation of solutions having the required relative vapor pressure. Tables are given containing data for sulphuric acid solutions, glycerine solutions, and saturated solutions of certain salts. In order to obtain a certain relative humidity one of the solutions is prepared having a relative vapor pressure corresponding to the desired relative humidity, and the air to be conditioned is washed with this solution or otherwise brought to vapor pressure equilibrium with it. Since the pressure of saturated water vapor changes rapidly with temperature change, resulting in a corresponding change in relative humidity for a given vapor pressure in the air, some form of temperature control is necessary. Several procedures are available, the choice depending upon the particular laboratory conditions and the accuracy required. The measurement of the relative humidity by means of a modified form of wet- and dry-bulb psychrometer is briefly described.

Introduction

For the routine testing of paper no arrangement can adequately take the place of a properly equipped testing room in which temperature and relative humidity can be maintained at constant values during the necessary period required for conditioning and testing paper, but there are many occasions when a small, inexpensive unit is needed. There may be special tests requiring a constant relative humidity different from that in the routine testing room, or experimental work requiring a series of relative humidities, or a quick change from one humidity to another.

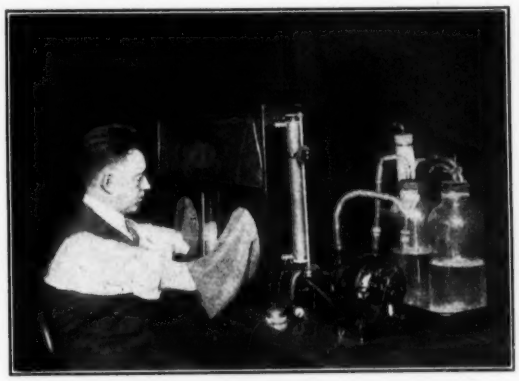


FIG. 2

Another view of the cabinet showing conditioning apparatus and further illustrating manner of manipulation from the outside.

There are a number of sources of information in the literature relative to means of maintaining constant humidity on a small scale. There has also been some work done in designing a testing cabinet for use in conjunction with such means of humidity control. The information is somewhat scattered and some of it is not readily available. In view of frequent inquiries relative to small-scale equipment for maintaining constant relative humidity, it has seemed advisable to prepare a brief publication so as to bring together in one paper the essential elements of these various sources of information and to emphasize certain necessary precautions in the use of such methods and equipment in the paper testing laboratory.

The importance of the subject is evident when it is realized that most physical tests of paper are meaningless unless the hygrometric state is controlled, and that paper testing laboratories have been somewhat slow in providing such control because of the expense of adequate equipment for regulating the humidity of the air of the testing laboratory.

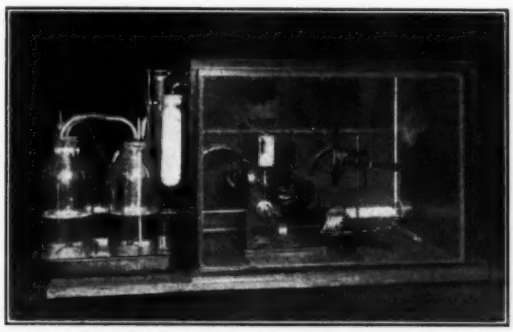


FIG. 1

View of the constant-humidity testing cabinet showing how the specimens are handled and the testing instrument manipulated by means of the rubber sleeves and gloves without the necessity of opening the cabinet.

Constant-Humidity Testing Cabinet

Although certain tests, such as the determination of weight and the study of moisture content, may not require any special apparatus other than that which is found in most laboratories, most of the tests usually made on paper, such as folding endurance, tearing resistance, tensile strength, bursting strength, and dimensional changes, require some special arrangement such that one can handle the specimens and make the measurements while the paper is in the conditioned air. In 1926 the writer gave a progress report on the design and development of a constant-humidity testing cabinet suitable for such uses.[2] A little later a patent[3] was issued covering this device, the drawings and specifications of which also comprise a good description of the essential details of the testing cabinet, although no information is given about the method of maintaining a constant relative humidity.

Only a brief description of the testing cabinet will be given here. A somewhat later form, involving the same essential elements, is illustrated in Figs. 1 and 2. This cabinet, which has a capacity of about 6 cubic feet, has sheet metal insulated walls with conveniently placed glass windows. Arm holes are provided which are fitted with rubber sleeves and gloves as illustrated so that one may manipulate the paper specimens and the testing apparatus inside the cabinet without having to open the cabinet or admit air from the outside. Conditioned air from gas washing bottles containing suitable conditioning solutions is circulated through the cabinet so as to produce a constant relative humidity of pre-

* Publication approved by the Director of the U. S. Bureau of Standards of the Department of Commerce.

[1] Associate Scientist, Paper Section, Bureau of Standards, Washington, D. C.

[2] A small constant-humidity testing cabinet. Tech. Assoc. Papers, 1926; Paper Trade Jour., Feb. 25, 1926.

[3] U. S. Patent No. 1,642,577. Apparatus for testing hygroscopic substances, Sept. 13, 1927. The patent was dedicated to the public and there are no restrictions on its use.

determined value in the cabinet. The choice and preparation of the conditioning solutions will be discussed later. A motor drives both the air circulating pump and the testing instrument inside the cabinet. Air is drawn from one corner of the cabinet, is forced through the large bubblers in the washing bottles which contain the conditioning solution, and is discharged through a glass wool filter into the diagonally opposite corner of the cabinet.

The testing chamber contains an auxiliary conditioning chamber which may be seen in Fig. 1. It is a large tube about ten inches long, the ends of which are closed with large rubber stoppers. One end communicates with the outside air when the stopper is removed. Unconditioned specimens of paper on the outside are placed in a small wire rack and inserted in the auxiliary conditioning chamber and the end stoppered. Conditioned air is drawn from the testing cabinet over these specimens until they have been properly conditioned, this air being circulated through the conditioning solutions before re-entering the cabinet. In this way fresh specimens are conditioned without disturbing the humidity in the cabinet proper. The stopper in the inner end of the auxiliary conditioning chamber can then be removed and the specimens brought into the cabinet for testing.

At T in Fig. 2 is shown a stoppered fitting into which a wet-bulb thermometer can be inserted in order to determine the wet-bulb temperature in measuring the relative humidity, the design being such that the velocity of the air at this point exceeds 15 feet per second. The air which passes over the wet bulb is circulated through the conditioning solutions before re-entering the cabinet.

The special forms of conditioning cabinets described by Wood[4] should be mentioned, although they are not suitable for paper testing since no means are provided for the manipulation of the specimens and the testing apparatus from the outside. The air was conditioned by blowing it over the surface of the conditioning solutions exposed in flat pans placed inside the cabinet.

Since the novel and distinctive feature of the testing cabinet developed at the Bureau of Standards is the means provided for manipulating the paper and the testing devices from the outside, some further details regarding the rubber sleeves and gloves seem warranted. The arm holes which are 7 or 8 inches in diameter are fitted with sheet iron flanges about an inch wide over which one end of each sleeve is fastened. The sleeves are in the shape of the frustrum of a cone, one end being the size of the arm holes and the other about 3 inches in diameter. From these simple geometrical relations a paper pattern can easily be prepared by means of which to lay out the sheet rubber sleeve. A single seam made with rubber cement is then necessary. Since sheet rubber of sufficient size is not always readily available, and moreover is somewhat expensive, it may not be amiss to drop the hint that a rubber kitchen apron which can be had almost anywhere for a small sum contains enough material for one sleeve. A pair of surgeon's gloves, large size, cemented to the smaller ends of the two sleeves completes the ensemble. The gloves should fit very loosely and should have a liberal sprinkling of talcum powder inside in order to facilitate inserting and extricating the hands. Large rubber bands are used to fasten the sleeves over the flanges.

There must be some means provided for accommodating the air which is displaced from the cabinet when the arms are inserted. A third aperture about 6 inches in diameter is provided in one of the walls, having the same flange construction as the arm holes. Over this flange is fastened a rubber bathing cap, preferably of the box-type. This will provide for a sufficiently large displacement volume.

Means of Laboratory Control of Relative Humidity

There are several well-tried methods of obtaining a given constant relative humidity for small-scale laboratory operations. In all of them the air required to be conditioned is brought to vapor pressure equilibrium with some aqueous solution which has a definite, known relative vapor pressure.[5] Three series of solutions which give good results are:

(1) saturated solutions of various suitably chosen salts,
(2) solutions of sulphuric acid in various concentrations,
(3) solutions of glycerine in various concentrations.

Solutions of calcium chloride in various concentrations have also been successfully, though infrequently, used for humidity control. Table 1 contains data for a selected list of saturated salt solutions,[6] which will be adequate for most ordinary requirements. Table 2 contains data for humidity control by means of sulphuric acid solutions[7] and also by means of solutions of glycerine.[8]

TABLE 1
RELATIVE VAPOR PRESSURE OF SATURATED SALT SOLUTIONS

Percentage relative humidity	Temperature deg. C.	Salt (solid phase)
9	24.5	$H_3PO_4 \cdot 1/2H_2O$
15	20	$LiCl \cdot H_2O$
30.5	16.4	NaCl, KNO_3, and $NaNO_3$
33.1	20	$MgCl_2 \cdot 6H_2O$
42	20	$Zn(NO_3)_2 \cdot 6H_2O$
43	24.5	$K2CO_3 \cdot 2H_2O$
51	24.5	$Ca(NO_3)_2 \cdot 4H_2O$
58	20	$NaBr \cdot 2H_2O$
67.3	20	$CoCl_2 \cdot 6H_2O$
75.8	20	NaCl
88	24.5	$BaCl_2 \cdot 2H_2O$
90	20	$ZnSO_4 \cdot 7H_2O$

TABLE 2
RELATIVE VAPOR PRESSURE AT 25 DEG. C. OF AQUEOUS SOLUTIONS OF SULPHURIC ACID AND OF GLYCERINE

Percentage relative humidity	Sulphuric acid		Glycerine	
	Percentage by weight	Specific gravity	Percentage by weight	Specific gravity
10	64.6	1.545	95	1.245
20	58.4	1.477	92	1.237
30	53.4	1.425	89	1.229
40	48.4	1.376	84	1.216
50	43.3	1.328	79	1.203
60	38.4	1.285	72	1.184
70	33.2	1.241	64	1.162
80	27.3	1.193	51	1.127
90	18.4	1.125	33	1.079

By plotting the data in Table 2 and drawing in a smooth curve one may obtain data for obtaining any desired relative humidity. In the source cited this is done for sulphuric acid solutions and curves are also given showing the change in relative vapor pressure with temperature.

The saturated salt solutions have the advantage that the vapor pressure at a given temperature does not change as long as some of the solid phase is present. They have the disadvantage that the vapor pressure changes more or less with temperature change and that the choice of humidities attainable by this means is limited to certain values (unless one choose the second temperature control procedure to be discussed later). With the acid or glycerine solutions, on the other hand, one can obtain any desired relative humidity by the proper choice of concentration. But the vapor pressure of these solutions changes with use as they become diluted or concentrated by interchange of moisture with the conditioned material. The glycerine solutions having relative vapor pressures below about 50 per cent are especially troublesome on this account since in the lower range the change in concentration per unit change in relative vapor pressure is comparatively small.

The air may be conditioned either by bubbling it through the conditioning solution or by blowing it over the solution exposed in shallow pans placed inside the cabinet, the arrangement being such as to afford a large contact surface between the air and the

[4] Humidity test equipment. Instruments, Vol. 1 (1928), p. 135.

[5] By relative vapor pressure is meant the ratio of the existing aqueous vapor pressure of a system to the pressure of saturated water vapor at the same temperature. Saturated water vapor is water vapor which is in pressure equilibrium with liquid water at the same temperature, or less rigorously, water vapor is said to be saturated when its concentration is the maximum which can exist at a given temperature. Relative vapor pressure when applied to an atmosphere has the same meaning as relative humidity.

[6] International critical tables, Vol. 1, p. 67. This source gives a more extended list together with the change in relative vapor pressure with temperature.

[7] Wilson, Humidity control by means of sulphuric acid solutions with critical compilation of vapor pressure data. Jour. Ind. Eng. Chem., Vol. 13 (1921), p. 326.

[8] Obtained from an unpublished study and calculation of constants by A. C. Walker, a member of the Technical staff of the Bell Telephone Laboratories. to whom grateful acknowledgment is made for permission to include these data in this publication.

solutions. In either case good circulation is necessary so as to facilitate the attainment of vapor pressure equilibrium between the air and the solutions, and so as to keep the air well mixed. If gas washing bottles are used in connection with a testing cabinet they should be especially designed to accommodate a large volume of air, as the ordinary forms do not permit of a sufficiently large volume rate of flow. A glass-wool filter should be used between the bottles and the cabinet to filter out entrained droplets. For such a purpose air from a compressed air line is not very satisfactory. Some sort of air pump by means of which the air can be recirculated in a closed system is almost a necessity. If the conditioning solutions are exposed in flat pans within the cabinet a fan or blower should be used and arranged so as to recirculate the air frequently over the solutions.

Harmful Influence of Temperature Variation

The problem of temperature control is perhaps the most serious obstacle to the assembling of a satisfactory simple apparatus for the small-scale conditioning and testing of paper. If one is fortunate enough to have available a constant-temperature room in which the apparatus can be set up most of the difficulties vanish. There is more than one way in which temperature fluctuations may affect the results. It is generally assumed that ordinary temperature differences do not affect the properties of paper, provided the relative humidity remains constant. This, however, is only approximately true. According to available data a temperature change of 3 or 4 deg. C. with a constant relative humidity has about the same effect upon the paper as a change of 1 per cent of relative humidity at a constant temperature. Another effect of temperature fluctuations is in altering the vapor pressure of the conditioning solutions. This effect is sufficiently small for the sulphuric acid solutions and the glycerine solutions that for all practical purposes the values in Table 2 may be used over the usual temperature range of the laboratory (about 20 deg to 30 deg. C.) without significant error. A change of 5 deg. C. in the temperature of the sulphuric acid solutions alters the percentage relative vapor pressure by about half a unit. The corresponding change for the glycerine solutions is even less. For the saturated salt solutions on the other hand, the corresponding change in relative vapor pressure is in general considerably more, sodium chloride being an outstanding exception. One should refer to the more complete data cited[8] if it is desired to use these saturated salt solutions at temperatures different from those given in Table 1. A change of 5 deg. C. in the temperature of these solutions alters the percentage relative vapor pressure from less than half a unit in the case of sodium chloride to 2 or 3 units in the case of some of the salts the solubility of which changes rapidly with change of temperature.

These two kinds of temperature effects (the effect upon the properties of the paper and the effect upon the relative vapor pressure of the conditioning solutions) are inconsequential in comparison with the much more serious one of the existence of a temperature gradient within an air conditioning system of the kind under discussion. If the air that is circulated in the inclosure and around the material to be conditioned is at a temperature different from that of the conditioning solution it will not have the relative humidity ascribed to it in the data for the conditioning solutions at this temperature. For example, suppose one makes up a solution, using the data of Table 2, so as to have a relative vapor pressure of 65 per cent at 25 deg. C., scrupulously maintains the temperature of the conditioning solution at exactly 25 deg. C., but allows the air in the conditioning cabinet in contact with the paper to vary somewhat and to attain a temperature of, say 26 deg. C. The actual relative humidity of the air in contact with the paper would then be, not 65 per cent, but 61.2 per cent. In other words, a difference of 1 deg. C. between the temperatures of the solution and the conditioning air would result in an error of about 4 per cent relative humidity in this region[9]. Had the temperature of both the conditioning solution and the conditioned air been at exactly 26 deg. C. the error would have been negligible. Hence it is evident that maintaining some definite temperature is much less important in these methods of control than being sure that there is no temperature gradient in the system (or if a temperature gradient is necessary, then to make sure that is does not vary).

There are a number of contributing causes for the large influence of temperature fluctuations upon the relative vapor pressure within an apparatus such as the one under consideration. Of primary importance is, of course, the great rate at which the pressure of saturated water vapor changes with temperature. The large volume rate of circulation of air necessary in the conditioning cabinet, and the large volume of air within the cabinet as compared to the volume in contact with the conditioning solution are important influences. If the air and the solution are at different temperatures it is not likely that they will come to temperature equilibrium when the air is passed rapidly through or over the solution. Consequently the air, although it may have the same vapor pressure as the conditioning solution will not have the same relative vapor pressure. It can not be too strongly emphasized that merely passing a stream of air through or over a solution having a certain relative vapor pressure does not at all insure that the air will have the same relative vapor pressure. One must be certain that an equilibrium of both vapor pressure and temperature is established between the two.

Another contributing cause is the difficulty in insulating a testing cabinet. It has been found that in a wholly inclosed system having thorough thermal insulation, such for example as a well insulated box containing a saturated salt solution in which the air is kept in motion by means of a fan, it is possible to maintain a sufficiently constant relative humidity without any temperature control. This is because the heat transfer through the walls is so slow that the air and the conditioning solution are always in temperature equilibrium as well as in pressure equilibrium. But it is scarcely possible to insulate this well a testing cabinet having the arm holes and rubber sleeves and equipment necessary to allow one to manipulate the testing apparatus from the outside.

Control of Temperature

Although the greatest precision in paper testing is not possible unless a constant temperature as well as a constant relative humidity is maintained, it is generally considered that for much of the ordinary testing of paper it is sufficient to have a constant relative humidity. But while it is not considered necessary to maintain a certain constant temperature within a cabinet for the conditioning and testing of paper, it must be apparent that it is necessary for the temperature to be rigorously under control. There are several procedures which may be used in connection with the temperature control necessary in maintaining a constant relative humidity in a cabinet or small inclosure:

(1). The temperature of the air in the cabinet is allowed to fluctuate according to the fluctuations of room temperature. The temperature of the conditioning solution is caused to change in exactly the same manner. This permits the simplest set-up but demands constant attention to the temperature of the solutions. One must be either heating or cooling them nearly all the time. A good way to effect the necessary change when using absorption bottles is to wrap the bottles with hot or cold cloths, as conditions may require. This method eliminates the most serious of the temperature effects, but does not affect the lesser temperature influences discussed above. This was the method used by the writer in connection with the cabinet illustrated, solutions of sulphuric acid being used as conditioning solutions.

(2). The conditioning solution is immersed in a constant-temperature bath at some conveniently maintained temperature, and the temperature in the cabinet is held at a slightly higher value by means of a thermostatically controlled heating unit. The

[9] See also discussion of precautions in Notes on Temperature and Humidity Control Cabinets, Cir. No. 310, Am. Paint and Varnish Manufacturers' Association, May, 1927.

vapor pressure of the solution is so chosen that air having been bubbled through it and then heated to the temperature in the cabinet will have the desired relative vapor pressure, or the temperature of the cabinet is so chosen that a given solution at a given temperature will give the desired relative humidity in the cabinet.

This procedure would be found convenient if one had a water supply of constant temperature at about room temperature or a little below with which to keep the conditioning solution at a constant temperature. By heating the air to slightly above room temperature and maintaining a constant temperature difference between the air and a suitably chosen solution a constant relative humidity should be maintained without very elaborate apparatus. It should be convenient also when it is desirable to use saturated salt solutions and one can not find a saturated salt solution having the desired relative vapor pressure. For example, a saturated solution of sodium chloride has a relative vapor pressure of 0.754 at 25 deg. C. Air in vapor pressure equilibrium with this solution would have therefore a relative humidity of 75.4 per cent at 25 deg. C. If this air were heated to 27.5 deg. C. in the cabinet and out of contact with the solution it would have a relative humidity of 65 per cent. The obvious danger in this procedure is the possibility of non-uniformity of the temperature within the cabinet.

(3). The conditioning solution and the atmosphere of the cabinet are both kept at the same constant temperature, the conditioning solution being so chosen as to have the desired relative vapor pressure for the temperature of the system. This procedure is the most satisfactory but requires the most elaborate apparatus. Good thermal insulation of the whole system is necessary. It is very desirable to have the cabinet surrounded with an annular air space through which is circulated air of the same temperature and relative humidity as that in the cabinet, this air in the outer annular space being rejected. The effects of leakage of either air or heat are thereby minimized and temperature differences within the cabinet can be more easily guarded against.

In all cases the control of temperature should be to within 0.1 deg. C.

Measurement of Humidity

The specific gravity of the unsaturated solutions is very helpful in making up the solutions and in detecting changes in the concentration with use. But since there is always some uncertainty about whether or not the theoretical equilibrium condition has been attained between the solution and the conditioned air, a direct measurement of the relative humidity should occasionally be made in order to be certain that it is what one thinks it is.

The measurement of the relative humidity in a small inclosed space offers some difficulty. There has been published a rather lengthy report on this subject alone.[10]

Filament hygrometers which depend upon the change in dimension of some colloidal material cannot be relied upon for accuracy. The most obvious method to the chemist, and the one which is usually regarded as the ultimate standard, is some form of absorption method involving a volumetric or gravimetric determination of moisture. Such a method is rather lengthy and tedious, and unless skillfully carried out may not have the accuracy assumed for it. The wet- and dry-bulb psychrometer, which is most commonly used as a reference standard in paper laboratories, cannot be used in its usual form in a small inclosed space, since the evaporated moisture would immediately upset the constant relative humidity which one is attempting to maintain. But in a properly modified form it is perhaps the simplest and most rapid reliable form of humidity measuring device for a small constant-humidity cabinet.

The thermometers, especially the wet-bulb, can be so arranged that air from the cabinet is drawn over them at a velocity of 15 feet or more per second, this air being rejected or returned through the conditioning solutions. A special exit tube may be provided for the wet-bulb thermometer or both thermometers may be placed in the exit line. The temperature data obtained are interpreted in terms of relative humidity in the usual manner by means of suitable graphs or tables.

The foregoing discussion is intended, not in any way to suggest that one might dispense with the constant-humidity testing room with which every paper testing laboratory should be equipped, but to afford some practical hints for the maintenance of constant relative humidity for conditioning and testing paper when the more elaborate equipment is out of the question, or when the nature of the tests or investigation demands a small flexible apparatus.

[10] Ewing and Glazebrook, Spec. Report No. 8, Food Investigation Board, Dept. of Scientific and Ind. Research (London), 1925.

Viscosity and Rag Evaluation

Egmont N. Wennberg[1] and G. E. Landt[2]

As a first step in making rag papers successfully, the separation of rags into grades is of paramount importance. The rag sorter classifies rags for paper making purposes according to their apparent qualities, each in different commercial grades, where each grade supposedly represents distinctive characteristics.

Many paper mills use a number of standard grades of rags which they usually classify according to the influence of the cooking operation on the yields and quality of the half-stuffs obtained, and on the average strength, softness and chemical characteristics of the resulting paper.

Table 1 can be given as an example of such a classification, which is based on apparent qualities such as age, average strength, bleachability and cleanliness of the rags.

Class 1 consists of cutting waste from garment factories, class 2 of used strong rags, class 3 of old dirty and weak rags and class 4 of soiled and very weak rags. The sub-divisions A, B, C stand for degree of bleachability; A representing easy bleachability, C being unbleachable, and B occupying an intermediate position. The letters "H" and "S" characterize the hardness or softness of a grade, within the class.

Table 1

Class	Type	Quality	Commercial Grading
	A	H	New White Cuttings
		H	New Canvas Cuttings
	B	H	Light New Jeans
		H	Light New Fustians
		H	Light New Cuttings
	C	H	New Dark Cuttings
		H	New Black Cuttings
		H	Silesias
	A	H	Light Fustians
		S	Light Cottons
	B	H	Colored Knits
		H	French Light Country Prints
		H	Colored Cottons
		H	German Blues
		H	Mixed Fustians
	A	S	No. 2 Whites
		S	Spanish Light Prints
		S	No. 3 Whites
	B	H	Thirds & Blues
		H	Medium Light Cottons
	C	H	Mixed Blacks
	A	S	No. 4 Whites
		S	Algerian Whites
		S	Egyptian Whites
		S	House Cloths
	B	S	Egyptian Colors
	C	S	Egyptian Blues & Blacks

Such a classification is important from the standpoint of substituting one grade for another, and from the standpoint of

[1] Junior member TAPPI; Chemist, Continental Diamond Fibre Co., Bridgeport, Pa.
[2] Member TAPPI, Chief Chemist, Continental Diamond Fibre Co.

blending rags to get certain definite characteristics in the finished paper.

However, wide variations of the qualities of a certain grade of rags renders the above comparison approximate only. As already mentioned, this is a consequence of rag sorting being based on apparent qualities, as it is difficult to determine, and impossible to control, the original quality and the wear and tear to which old rags have been subjected. The new rags vary similarly, depending on the original cotton and the subsequent modifying processes the cellulose has been subjected to. These variations can be modified by blending and proper handling, but time and again the mill man is confronted with difficulties traceable to the raw materials. This is especially apparent when soft absorbent paper, or paper designed for subsequent chemical treatment, has to be made.

Classification by Viscosity

In order to overcome these difficulties, different attempts to analyze the raw materials in the laboratory have been made. The possibility of classifying the rags on the basis of a complete chemical analysis is remote, as the background of fundamental knowledge is too fragmentary and the amount of labor that such an approach would involve is too great. However, viscosity determination made on standard solutions of rags in copper ammonium solutions offer an empirical means of doing this.

The cuprammonium viscosity test has been comparatively recently introduced in the paper industry by Bialkowsky[3], who showed there existed a direct relationship between folding strength and the viscosity of the finished paper. The method developed by the Shirley Institute in England has been adopted by several paper manufacturers and has already been described in the Journal of the Textile Institute[3].

Clibbens and Ridge[4] have pointed out that the viscosity and fiber strength are directly proportional. From viscosity and colloidal principles it would follow that the viscosity would vary with the size of the cellulose micelle. The increase in strength with increased viscosity would also bear this out.

The data in Table 2 further support the theory that viscosity may be indicative of a change in the micelle. Thirds and blues were cooked in liquors of varying concentration of sodium hydroxide with the following results:

Table 2

Rag	Caustic grams/liter	Yield	Silver No.	Visc. in centipoises	Percent soluble in 7.2% sodium hydroxide
			3.25	25.7	
	14.0	78.2	2.78	18.0	6.0
	26.0	75.5	2.86	16.7	6.4
	42.0	73.6	2.96	13.7	5.9
	47	71.3	3.10	13.1	6.2

The very appreciable decrease in viscosity with the increase in sodium hydroxide concentration is by no means parallel to an

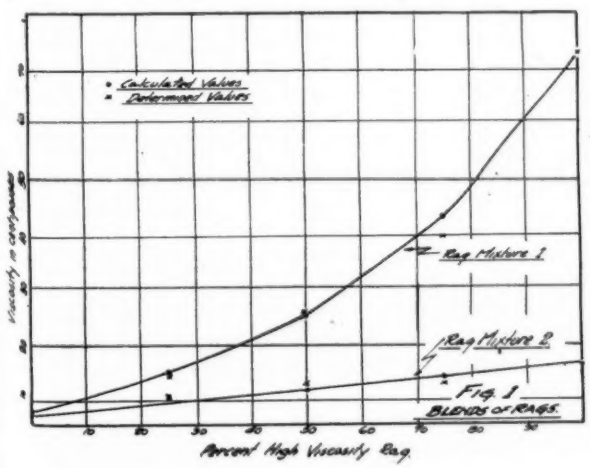


Fig. 1
BLENDS OF RAGS.

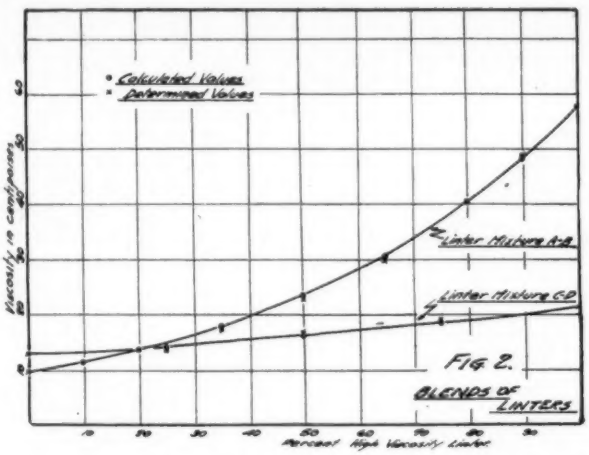


Fig 2.
BLENDS OF LINTERS

estimate of impurities present. The silver number increases slowly and does give evidence of a slightly increasing amount of decomposition products. The soda soluble value on the other hand remains practically constant. This persistent change in viscosity indicates a change in the micelli as distinct from the effect of degradation products. This is further borne out by the susceptibility of the fibre to gelatinize when treated with zinc chloride. This susceptibility is 40 per cent greater in the last cook than in the first cook.

It has been shown that impurities, especially decomposition products of cellulose and related carbohydrates, will also exercise an influence on measurements of viscosity, and depress such values as their tendency to dissolve completely increases[5].

With these facts in mind, viscosity determinations has been made on a number of market grades of rags. The method followed was that of the Shirley Institute using 1 gram of cotton to 100 cc. of cuprammonium. The standard pipettes were rotated over night at a speed of 5 r.p.m. and the viscosity was determined at a temperature of 25 deg. C.

The rags were sampled by an experienced rag man in the sorting room, by selecting from several bales representative rags in the proportion in which they appear to exist. These samples were cut into small pieces by hand, thoroughly mixed, fluffed in a disintegrator, and washed to remove dirt. Viscosity results on different grades of rags are given in Table 3.

Table 3

Rags	Viscosity cp. High	Low	Ave.
Jeans	75.0	64.0	65.9
New Dark Cuttings	79.9	30.0	57.7
Silesias	55.4	51.0	52.5
New Light Cutting	55.7	44.5	51.0
Colored Cottons	31.5	25.5	26.2
German Blues	26.2	23.0	24.7
Mixed Fustians	25.8	15.7	24.0
Thirds & Blues			21.0
Medium Light Cottons	18.7	11.2	15.0
Dark Cottons			11.6
No. 2 Whites	10.5	9.0	9.7
No. 3 Whites			7.5
No. 4 Whites	8.9	7.0	7.5
Egyptian Blues & Blacks			7.1

The classification given in Table 1 appears to be only approximately justified by these viscosity values. When arranged in the order of decreasing viscosity, different market grades fall into the class order given in Table 1. The classification into four grades seems not to be entirely justified as the rags of both class three and four have similar viscosities. Dirt and bleachability are not taken into consideration in the viscosity determinations, however, and this may justify the formation of the fourth class. These figures illustrate clearly the variation which each grade offers. The new dark cuttings, for instance, show a variation of one hundred and fifty per cent.

The severity of the cook and the amount of bleaching will reduce the viscosity of the half-stuff obtained. This must be

taken into consideration when blending rags for a specific combination of paper characteristics; thus the problem becomes one of correctly blending rags to secure a half-stuff of the desired physical and chemical characteristics.

Properties of Blended Rags

The properties of blended rags were studied as follows: Rags of different viscosity values were blended, and the viscosities of the blends were determined. The values obtained for two sets of blends are given in Table 4. These values when plotted in Fig. 1, approach a logarithmic curve. The following formula was, therefore, derived as a means of relating the viscosities of rag mixtures.

$$\eta = \left(\frac{\eta_2}{\eta_1}\right)^{\rho} \eta_2$$

where

η = viscosity of mixture
η_2 = viscosity of high viscosity cellulose
η_1 = viscosity of low viscosity cellulose
ρ = percentage high viscosity cellulose

Table 4 gives also the viscosities calculated from the above equation. At one point only is there any considerable discrepancy between the calculated and determined values. It is suggested that this discrepancy may be brought about by the difficulty of obtaining absolutely uniform samples in this type of material.

To further check this equation and to secure greater uniformity of samples, cotton linters were blended and the viscosity values for the blends were determined. These are related to the calculated values in Table 5 and are shown in Fig. 2. The equation seems to be entirely substantiated.

Table 4

% Rag: New Cuttings	% Rag: Medium Light Cottons	Viscosity Determined	Viscosity Calculated
100	0	73.0	—
75	25	39.75	43.81
50	50	25.3	25.05
25	75	14.57	15.83
0	100	9.51	—
Mean deviation		±6.0%	

Rag Mixture 2

% Rag: No. 2 Whites	% Rag: Thirds & Blues	Viscosity Determined	Viscosity Calculated
100	0	9.46	—
75	25	10.45	10.93
50	50	13.01	12.55
25	75	14.80	14.59
0	100	16.85	
Mean deviation		+0.1%	

Table 5

Mixture 1: Linters

% Linter A	% Linter B	Viscosity Determined	Viscosity Calculated
100	0	57.4	
90	10	47.4	47.9
80	20	40.1	40.1
65	35	29.4	30.4
50	50	22.5	23.15
35	65	17.0	17.6
20	80	13.25	13.4
10	90	11.10	11.20
0	100	9.35	
Mean deviation		±1.4%	

Mixture 2: Linters

% Linter C	% Linter D	Viscosity Determined	Viscosity Calculated
100	0	21.0	—
75	25	18.42	18.12
50	50	15.72	16.11
25	75	14.14	13.92
0	100	12.43	—
Mean deviation		±0.53%	

Discussion

The viscosity characteristics of cellulose solution are undoubtedly the resultant of all the conditions that exist in the material, such as the character of the celiulose along with existent impurities. One of the functions of cooking and washing operations is that of bringing into solution those materials which are not pure cellulose. This can only be partially accomplished. The properties of the resulting half-stuff, and of the paper prepared from it are to a degree dependent on the micellar character of the cellulose. Since the estimate of micellar character is dependent on viscosity determinations, it is obvious that misleading conclusions can be drawn if impurities are present in unusual amounts. This may be determined, however, by standard tests like solubility in 7.2 per cent hydroxide and reduction value on Fehling solution or silver nitrate solution.

Coordination between viscosity and manufacturing conditions is necessary in order that the conclusions of the forgoing work may be satisfactorily applied to manufacturing operations. It follows, that in each mill the value and importance of the methods described must be appraised with respect to the aim of the manufacturing process. The value of the methods suggested will be apparent only where the strength, absorptive capacity, or chemical qualities of the paper are exacting.

A further study of the relations existing where three or four grades of rags are blended, and of the general effect of blending of different types of pulp is in order and will be undertaken by the authors.

In the foregoing, it has been shown that the viscosity of rags follows such a classification of softness and strength as might arbitrarily be adopted to facilitate manufacturing methods. Variations in viscosity values are, of course, wide as the nature of the material would require. An equation has been suggested whereby rags of different viscosities may be blended to obtain a required viscosity value.

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[3] H. W. Bialkowsky: The Cuprammonium Viscosity of Cotton Cellulose as Related to Paper Making, Technical Association Papers, Series XIII, pg. 195-200
[4] Clibbens and Ridge: J. Textile Inst., 19, T389.
[5] Bertwell, Clibbens and Geake: The Chemical Analysis of Cotton Hydrocellulose. J. Textile Inst. 17, T145.

TAPPI Notes

K. B. Howell, formerly consulting engineer in New York, is now with the Mercon Regulator Company, 1 La Salle Street, Chicago.

A. E. Leighton, formerly engineer for the Management Engineering and Development Company, Dayton, Ohio, is now located in Gray, Maine. Mr. Leighton has made no definite plans for the immediate future.

Axel Klingberg, formerly chemical engineer of Thilmany Pulp and Paper Company and of the Puget Sound Pulp and Timber Company, is now with the Washington Pulp and Paper Company at Port Angeles, Wash.

Arthur B. Green, who was recently with S. D. Warren Company, Cumberland Mills, Maine, has opened a consulting engineering office for management engineering, precision control and paper mill problems, at 249 Harris Avenue, Needham, Mass.

Otto Knutz, formerly assistant manager of the Corn Stalk Products Company, Danville, Ill., is now a chemical engineer in the Kreuger & Toll organization at Stockholm, Sweden.

J. M. Hibbs, formerly with the Paper Makers Chemical Company, Kalamazoo, Mich., is now with the Vera Chemical Company at Freeman, Ont.

R. H. Laftman, formerly vice-president of the Bogalusa Paper Company, is now manager of Billingfors-Langed A/B, in Sweden.

P. D. Switzer will discontinue his services as sales manager for the Moore & White Company on November 15. He was for a number of years sales engineer for the Bird Machine Company. Mr. Switzer is located at 8 Jericho Road, Abington, Pennsylvania, and has made no plans for the immediate future.

K. A. Hultan, formerly engineer of the Cushnoc Paper Company, is now traveling in Norway and Sweden and may be reached at Trysorum, Sweden.

S. E. Meyers has resigned his position as mechanical engineer of the Merritt Engineering and Sales Corporation, Lockport, N. Y., to become effective November 15, 1931. Mr. Meyers has made no definite plans.

Swedish News Print Production

WASHINGTON, D. C., October 28, 1931—Swedish news print production during the month of August totaled 24,066 metric tons as against 19,571 tons during the corresponding month of last year.

POWER PLANT SECTION

REDUCING POWER COSTS THROUGH UNIT TREATMENT

Conducted by **Reginald Trautschold Consulting Engineer**

Profits and Handling Costs *

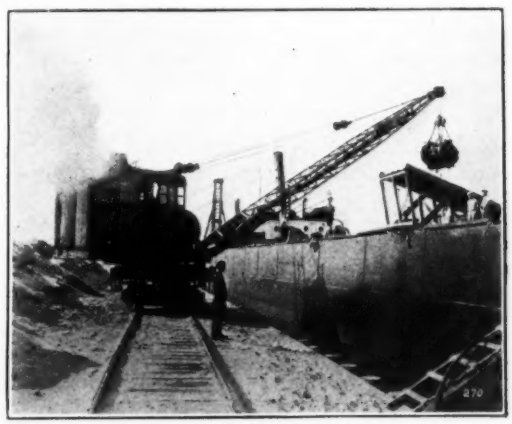
Cranes, Hoists, Tractors and Trucks

Profits derived from paper making activities are dependent in no small measure upon handling costs. Good times or bad, opportunities can always be found for effecting some worthwhile economy by a betterment in methods of handling materials in process, mill products in and about the plant, output to shipping conveyances, to warehouses and storage. When times are good and mills are busy, the methods of materials handling in use may tend to limit the output of the plant, while when times are bad and output is curtailed, the unit handling expenses invariably mount and it costs more to fill and ship an order.

There is nothing novel or unusual in this situation, it is more or less common to all lines of manufacture, but it is particularly burdensome in pulp and paper mills, with their large volume output and their necessarily heavy investment in production equipment. Even the average paper mill is faced with serious materials handling problems, necessitating the use of many and diverse types of materials handling equipment, from locomotive cranes to hand trucks. This multiplicity of equipment, of methods as well, is quite characteristic and cannot well be avoided.

Some of the newer mills have given a good deal of attention to the question of materials handling, of course, and production progresses in an orderly manner, but for the most part the handling problem has been subordinated to that of production. The inevitable result has been that, not only has there been little or no standardization in materials handling methods, but a complex situation has developed in many mills, one which of necessity commands individual solution.

Also, as a mill's activities increase and expand, new

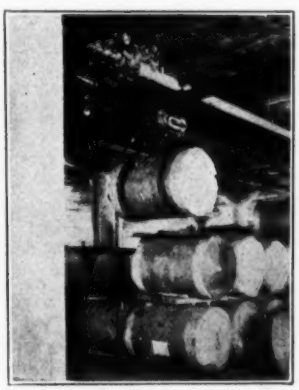


Courtesy: Industrial Brownhoist Corp.

FIG. 1

25-ton steam locomotive crane with log grapple handling pulp wood.

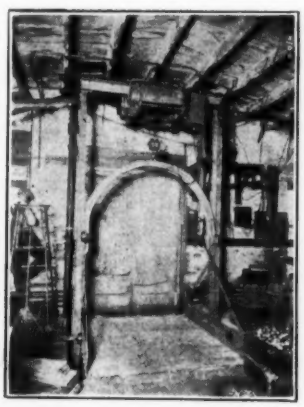
* For previous discussions on Cranes, Hoists, Tractors, etc., see Paper Trade Journal, Feb. 20, 1930; Feb. 5, Feb. 19 and Mar. 4, 1931.



Courtesy: American Engineering Co.

FIG. 2

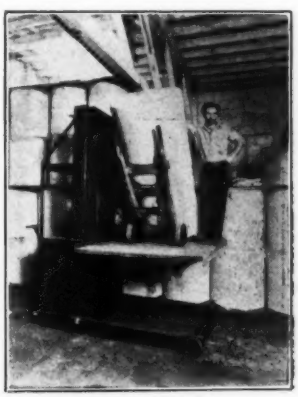
Monorail hoist stacking rolls of paper.



Courtesy: American Engineering Co.

FIG. 3

½-ton electric hoist operates elevator at L. Newman & Son Co., New Haven, Conn.



Courtesy: Lewis-Shepard Co.

FIG. 4

Telescopic portable elevator used for the piling of rolled paper.

materials handling problems are very apt to crop up, the caring for which frequently introduce further complications and add to the varieties of handling methods employed. So cumbersome and unwieldy may become the improvised methods of handling, in fact, that a complete rearrangement of mill equipment, with more direct and efficient routing of materials and products, is advisable. Such a drastic upheaval may effect very desirable economies and betterment in the handling of a mill's material supplies and its products, but is rarely attempted unless the situation really becomes acute.

Before such heroic measures are resorted to, the average mill is inclined to temporize, as a rule, and to strive to build up, by careful attention to the needs as they arise, a materials handling system of its own. The methods and equipment employed may, and usually do, differ widely. Likewise, the results. To avoid costly mistakes, consequently, familiarity with available materials handling equipment and methods are essential and in this connection a survey of existing handling practices meeting the needs of other mills can be taken periodically to very decided advantage. So diverse are the successful systems in use, that no mill is sufficiently well situated in respect to its handling methods that it can afford to overlook systems of demonstrated merit in other mills.

Cranes and Hoists

The use of locomotive cranes for handling pulp logs, as an example, may interest only a few mills, but the storage capacity of a yard was greatly increased and handling costs considerably reduced by the use of a 20-ton steam locomotive crane equipped with a log grapple in just such service at Ladysmith, Wis., by the Great Western Paper Corporation. The mobility of the unit and the fact that it could be used on construction work about the property are considerations that carry weight.

Overhead cranes of all types can frequently be used profitably in both power plant and mill, particularly those of the transfer variety, on and over which mobile hoists pass from track to track and from one part of the building to another, but of especial value to pulp and paper mills are the many varieties of hoists, operated by power or hand. These adaptable units can be installed almost anywhere and for all kinds of service. They occupy very little space suitable for other uses and frequently effect marked economies in handling operations.

At the plant of one eastern fabricator of corrugated paper shipping boxes, rolls of liner board weighing 500 to 1,500 pounds are unloaded from freight cars by a 1-ton electric, I-beam, hoist system about 1,000 feet in length and placed in storage, piling the rolls practically to the ceiling. An official of this establishment is reported to have stated that this efficient method of storing had not only added about 50 per cent to the storage capacity of the plant, but the materials handling system had cost virtually nothing for repairs and that there had not been a single minute of interruption to production activities occasioned by a failure of the materials handling equipment. This, after several years of continuous operation.

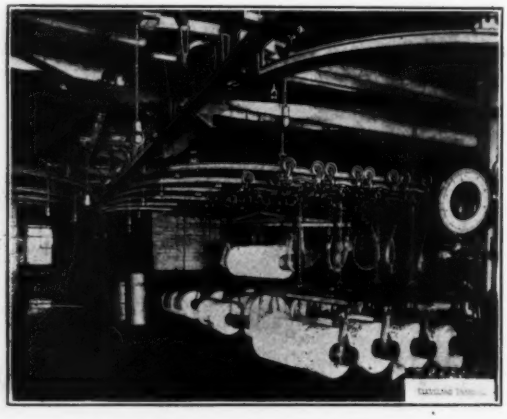
Like compactness of storage is secured in a mid-western paper mill by similar materials handling equipment, doubling the former storage capacity with only a relatively small addition of handling equipment. About 5,000 feet of beam track is employed and, as two railroad switch tracks have to be crossed, a turntable construction, which, when open, clears the tracks and, when closed, spans the right-of-way and forms a continuous transportation system, was installed. It is said that the installation saves materially in payroll, time and damage to paper, five men handling all the rolls between two buildings on opposite sides of the two-track railroad spur.

An excellent example of the marked adaptability of the beam hoist and trolley system is an installation at the Carrollton Parchment Paper Company, West Carrollton, O., where such equipment is used to handle rolls of wax paper from the parchment paper machines, through the

Courtesy: Mercury Mfg. Co.

FIG. 6

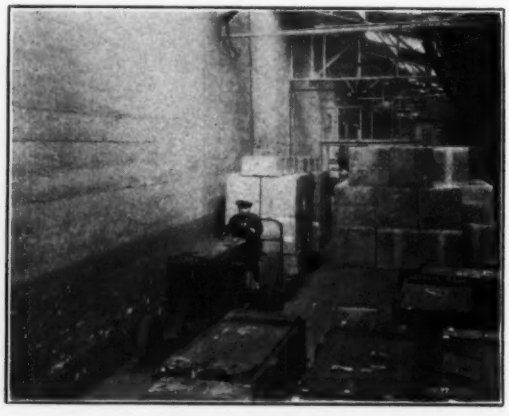
Tractor in service at plant of Kimberly-Clark Corp., Kimberly, Wis.



Courtesy: Cleveland Crane & Engineering Co.

FIG. 5

Rolls skirting waxing machine at the Carrollton Paper Co. plant.



Courtesy: J. I. Case Corp.

FIG. 7

Heavy service and grades efficiently negotiated by gasoline tractors.

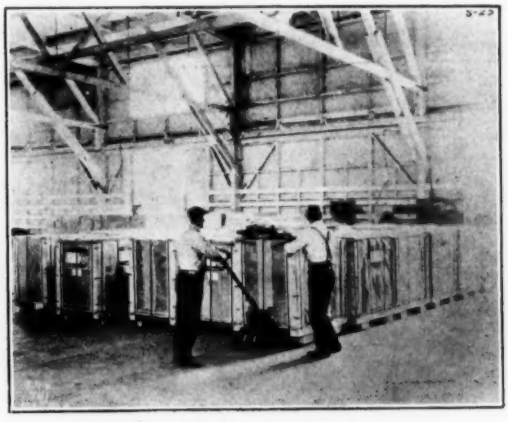
printing and waxing operations, then into storage and finally to the shipping platform, all with a minimum amount of rehandling and the elimination of virtually all damage to the paper. The rolls are placed on carriers on a grab, as they come from the parchment paper department, and suspended from trolleys are run to an elevator and up to a higher floor where the presses are located.

Each of these presses is provided with a rigid mounted hoist, by which the rolls, as they are brought to the presses by the trolleys, are transferred to the printing machine. On completion of the printing operation, the rolls are returned to the grabs by the hoists and are carried by the trolleys, via the elevator, to the waxing machine on a lower floor. At the waxing machine are two stationary hoists, one to transfer the rolls to the machine arbor and the other, at the far end of the machine, to replace the rolls on the carrier trolleys by which the waxed rolls are taken and placed in storage. Then, when the rolls are taken out for shipment, they are run over a scale, weighed, wrapped and placed in freight cars, the trolley system running within a few feet of the car side to minimize rehandling operations.

This system is used in place of the former practice of handling the rolls on floor dollys and has effected marked reductions in damage to rolls and the resulting waste, besides providing considerably greater storage capacity. Handling the rolls exclusively on center cores results in substantial savings, for if there is any waste from wax sticking, due to the suspension of the waxed rolls on their cores, only a few layers, three or four, of small diameter wrap are damaged. On the other hand, when handling the freshly waxed rolls on floor dollys, eight to ten layers of large diameter wrap were damaged, the core and outer diameters of the rolls being 6 and approximately 24 inches respectively.

Another novel and ingenious adaptation of the compact and efficient beam hoist to an unusual service is at the factory of L. Newman & Son Company, New Haven, Conn., where there is a difference in elevation between one of the stock rooms and the shipping department of about 6 feet. Stock in ¼-ton loads is run from the stock room to the shipping department on hand trucks and a ½-ton anchored beam hoist is utilized to raise and lower a platform, or cage, between the two floor levels. This improvised elevator for handling the stock trucks is operated about a dozen times a day and proves as satisfactory as would a much more costly standard type of elevator.

The hoist, which is provided with stopping devices for automatically holding the cage at the respective floor levels, handles the service trucks safely and conveniently, 3 to 5 minutes operation being required per load. Transferring the trucks from one level to the other in this manner entails a labor cost of only 75 cents per day and the serviceable rig represents a total investment, exclusive of the cost of the comparatively inexpensive hoist, of about $200.00.



Courtesy: Yale & Towne Mfg. Co.

FIG. 8

Lift trucks and skid platforms have revolutionized handling practices.

Courtesy: Elwell-Parker Electric Co.

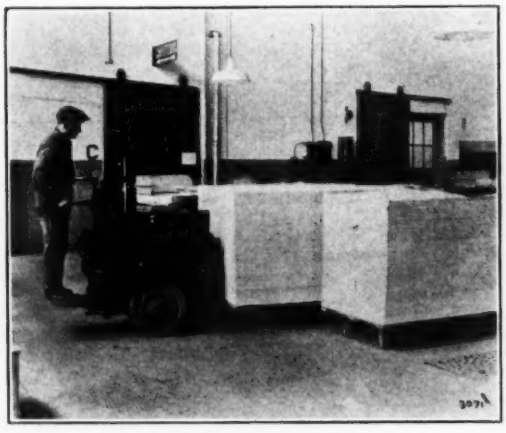
FIG. 9

Modern elevator, chisel type, electric trucks, battery or gas-electric driven, are extremely adaptable to paper mill services.

Tractors Have Proved Profitable Investments

The use of tractors and trailers in and about paper making establishments is not as common as in many other industrial plants, it would seem, but the units are very suitable for certain services and have well shown their worth in a number of instances. Fifteen or more years ago, the Kimberly-Clark Corporation investigated the possibilities of employing such units at certain plants. Even before this, however, the New York & Pennsylvania Company, Inc., made use of a tractor and a train of trailers to transport rolls of paper.

In the case of the Kimberly-Clark Corporation, the advisability of using tractors was taken up at a time when it was felt that the cost of labor which could be released for more productive operations than simply pulling trucks about the plant was unduly high for such trucking service.



Courtesy: Elwell-Parker Electric Co.

FIG. 10

Electric lift truck service at the Champion Coated Paper Co. plant at Hamilton, Ohio.

It was found that electric tractors could pull the ordinary 4-wheel hand truck in trains through passages and aisles just about as readily as a single truck could be handled by man-power and at much less expense. On these findings, hitches were devised and installed at small cost on the hand trucks for convenience in making up trailer trains for movement by the tractors, the system being adopted by several of the firm's plants.

The use of gasoline tractors also provides good opportunities of effecting highly desirable economies in handling practices. Such units are generally very much cheaper and of more rugged construction than electric tractors, have greater traction and can be run at less expense. They operate at substantially constant efficiency over long as well as short periods of service and are able to negotiate grades more successfully than the electrics. Also, though more commonly advocated chiefly for handling pulp and other materials in or about the mill yards, it is a fact, one rarely appreciated, that the fire insurance interests rate the fire hazard introduced by gas tractors lower than that connected with the employment of electric tractors.

The Hand Lift Truck System

It is the hand lift truck system of handling and the shipment of pulp and paper stock on skid platforms, however, that is probably of chief concern to most mills of the industry. This modern method of handling was developed originally for use in paper making plants, some twenty or more years ago, and has today literally revolutionized the movement and transportation of paper consignments. The economies effected in moving costs and storage of goods has been most marked, the expense of handling being reduced on the average fully 50 per cent. For a large mill, this may mean a saving of up to $50,000.00 a year. Per lift truck per year, the savings usually run in the neighborhood of $1,200.00.

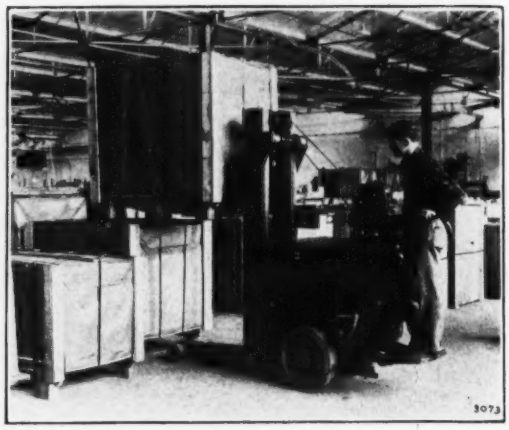
Crating of flat stock is eliminated in skid platform shipments, freight cars are quickly loaded or unloaded, damage to consignments is greatly reduced and storage problems much simplified, all economies that materially affect the price of paper. For example, a wooden case to hold 600 pounds of paper, a common unit of weight, costs today something like $2.50. It is now quite customary to place and ship on a single, inexpensive, skid platform as much as 4,000 pounds, the equivalent of seven cases.

To voice the opinion of one of the pioneers in skid platform shipment and one that has had probably more experience in that method of transportation than almost any other firm in the industry, the West Virginia Pulp & Paper Company, it is felt that the extension of the lift-truck system has saved that concern a great deal of money. It has released freight cars sooner, avoiding demurrage penalties in some cases, and it has meant added convenience for the users of the firm's products. Incidentally, because other competing paper mills have not followed the lead of the West Virginia Pulp & Paper Company, that concern has gained the reputation in some quarters of being very progressive and of the live wire type, with the best interests of customers always in mind. A goodwill asset of this order means much to the interests of any mill.

Courtesy: Elwell-Parker Electric Co.

FIG. 11

An electric truck that saved the labor of ten men.



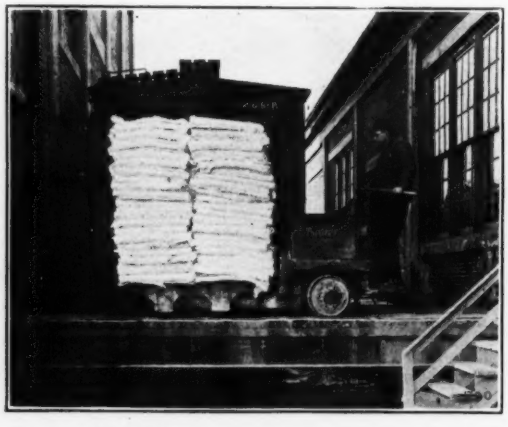
Courtesy: Baker-Rauling Co.

FIG. 12

Type of tiering truck used by Jersey City Printing Co. for elevating skid loads of flat stock.

Motorized Roll and Lift Trucks

The electric truck for handling rolls of news print and other paper mill products shipped in rolls, also a development of the paper industry, followed the introduction of the hand lift-truck by about eight years and promptly was established as a paper mill essential. Fitted with lift platforms, it rivals the hand lift-truck in furthering skip platform shipments of pulp and paper and with various arrangements of forks, arms, and bayonets handles the heaviest rolls with ease and dispatch. Incorporating elevator and hoist features as it has been refined, it effectively meets needs in tiering services. In short, it has become



Courtesy: Baker-Rauling Co.

FIG. 13

Electric lift truck handling load of pulp at the Riegel Paper Corp. plant, Milford, N. J.

in one form or another virtually indispensable in caring for the requirements of mills, warehouses and large users of paper.

In one mill, where time studies were made to determine the comparable costs of handling rolls of paper by hand and by an electric truck designed for the service, the following figures were recorded:

	Costs per Roll		
	Labor	Truck	Total
By hand (6 men)	$0.133	$ ...	$0.133
By electric truck (2 men)	.034	.014	.048
Saving effected by electric truck per roll			$0.085

The Elwell-Parker Electric Co.

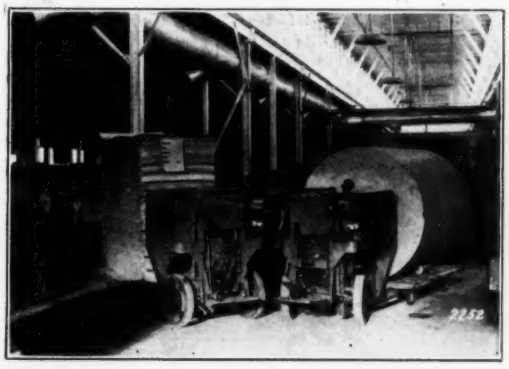
Handling four cars of rolls per day at a saving of 8½ cents per roll, the electric truck paid for itself in savings effected within a year after its purchase.

One operator, with a single helper, at another mill handled four cars of rolled paper, 132 rolls in all, in a single day, with an electric truck, transporting each roll a distance of 400 feet. The same job consummated by hand required the services of six men working steadily throughout the day, so crediting the electric truck with an annual payroll saving of $3,054.00. At still another establishment, one platform electric truck and a system of platform skids has replaced the labor of ten men, effecting a cash saving of approximately $72.00 a day. In other words, a lopping off of $21,600.00 from the payroll, based on a 300 day operating year.

When it comes to making use of the tiering feature of the modern electric lifter in storage service, economies of like or even higher order are often effected. One mill reports increasing the capacity of its storeroom by such means from six to fourteen car loads and, incidentally, eliminating two men from the job of handling rolls.

At the Jersey City Printing Company, Jersey City, N. J., where a modern type of electric, low skid, tiering truck, similar to units employed by the Champion Coated Paper Company, is in use, savings of $300.00 a week are reported. This company prints and distributes semi-annually something like 18,000,000 telephone books and formerly both the flat paper stock and the books were transferred from the press room to the bindery by hand trucks. Each truck required the services of two men and it took from six to eight men to transfer a single ton of material.

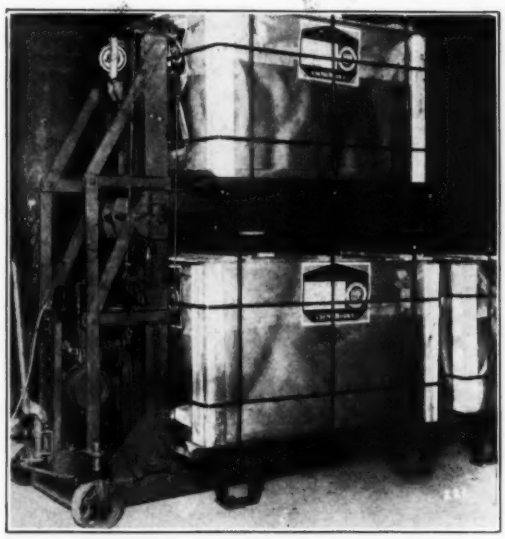
Now, the telephone books and flat paper stock are handled entirely by an electric lift truck, the coated paper stock which formerly arrived in cases being received at present direct from the paper mill on skid platforms, and the electric is also used in returning the printed paper, by the latter service saving the labor of three men formerly employed repacking the printed paper. During peak production, the lift truck is in service 24 hours a day.



Courtesy: Automatic Transportation Co.

FIG. 14

Electric trucks handle flat stock or rolls on skid platforms.



Courtesy: Lewis-Shepard Co.

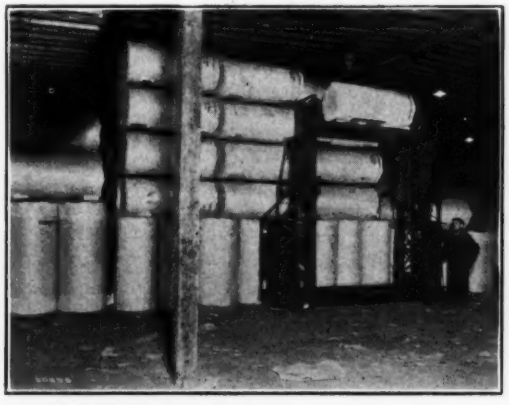
FIG. 15

5,000-lb. stacker or portable elevator used for double decking loads of skidded paper.

The adaptability of the electric lift truck is very marked and full advantage would appear to be taken of the fact at the Warren Manufacturing Company at Milford, N. J., where one operates four or five hours daily unloading pulp from freight cars and placing it in the store house, simply as part of a day's job. For another hour each day, the truck is in use unloading raw material supplies, such as hydrated lime and alum in bags, while for the balance of each day the truck is employed for so-called general work, moving pulp from the store house to various points in the mill, shunting freight cars and other miscellaneous hauling services.

Saving Money Elevating, Stacking and Tiering

The value of the electric when converted into tiering, stacking and elevating machines, whether of the self or hand propelled varieties, is very marked. W. A. Ritchie, Superintendent of the Marathon Paper Mills, Ashland, Wis., states: "In regard to the saving made by us with the use of the lifter (a high-lift stacking machine, or



Courtesy: Economy Engineering Co.

FIG. 16

Handling rolls of news print economically with electric elevator truck.

Courtesy: Barrett-Cravens Co.

FIG. 17

Portable elevator in constant service for the past five years at the California Bag & Paper Co., Emeryville, Cal.

Courtesy: J. B. Engineering Sales Co.

FIG. 18

Lowering roll on vertical grab to horizontal position for trucking or rolling purposes.

elevator), we figure that this machine has been responsible for a 30 per cent decrease in the cost of handling sulphite. Also, enabling us to store more pulp by stacking higher with a reduced crew, two men doing the work now which took six and eight previously."

This particular machine has a lifting capacity of 6,000 pounds, a 5-horsepower motor, operated from a mill circuit, raising or lowering the lifting arms at a rate of 15 feet per minute, whether the machine is loaded with a skid load or is running light. The supporting base-wheels, the machine being moved by hand, are mounted in anti-friction bearings, permitting the machine to be moved from place to place with very little effort.

At the Container Corporation plant in Chicago, a tiering machine of somewhat similar construction has been stacking bales of waste-paper and bundles of pulp to rafter height for the past twenty years. It has a capacity of about 1,500 pounds and an elevating range of approximately 20 feet. Still another portable elevator with an enviable service record, is a type of platform lift that has been in constant service for the past five or six years at the plant of the California Bag and Paper Company at Emeryville, Cal.

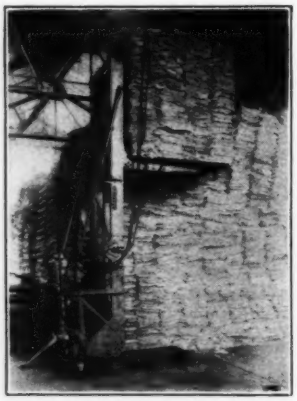
Aid to Vertical Roll Stacking

In the handling of heavy rolls of paper, news print, etc., storage economy as well as safety favors vertical stacking, for which reason a few brief comments regarding a new, internal type, grab would seem quite pertinent, for in trial this device has substantially reduced roll handling time. The device is especially desirable where vertical stacking is effected by the use of a crane, a method advocated by some experienced mill men and engineers.

The grab, semi-automatic in operation, is slipped into the paper roll core, a lever is manipulated, and as the hoist lifts the grab's internal wedges are forced outward, gripping the core firmly. When the roll is dropped into its destined position, the crane hook is lowered and the wedge jaw teeth release the core, permitting the grab to be withdrawn easily. The proportions of the grab are such, moreover, that a roll can be brought quite readily from a horizontal to a vertical position without the aid of bale hooks or other handling devices. Also, the roll can easily be lowered to a horizontal position for trucking or rolling purposes, the grab being removed after the roll is on its side.

Handling the rolls in this manner expedites stacking operations and permits very close stacking. It is claimed, in fact, that with a man on the pile an extra row can be piled than would otherwise be feasible. The grab itself, though exceedingly powerful so far as its lifting and

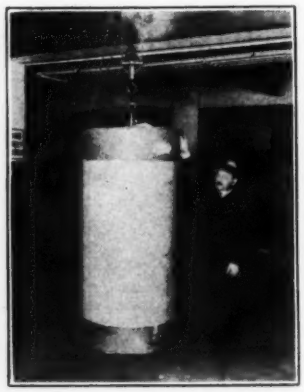
(Continued on page 88)



Courtesy: Economy Engineering Co.

FIG. 19

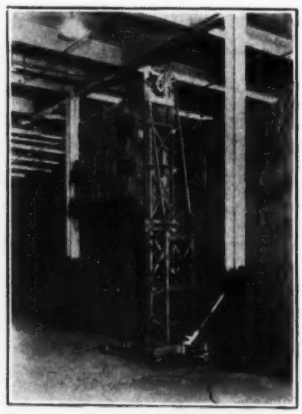
6,000-lb. lifter decreases cost of handling sulphite 30 per cent at the Marathon Paper Mills, Ashland, Wis.



Courtesy: J. B. Engineering Sales Co.

FIG. 20

Vertical lifting with internal grab.



Courtesy: Economy Engineering Co.

FIG. 21

1,500 lb. heavy duty electric has piled bales of waste paper and bundles of pulp for more than twenty years.

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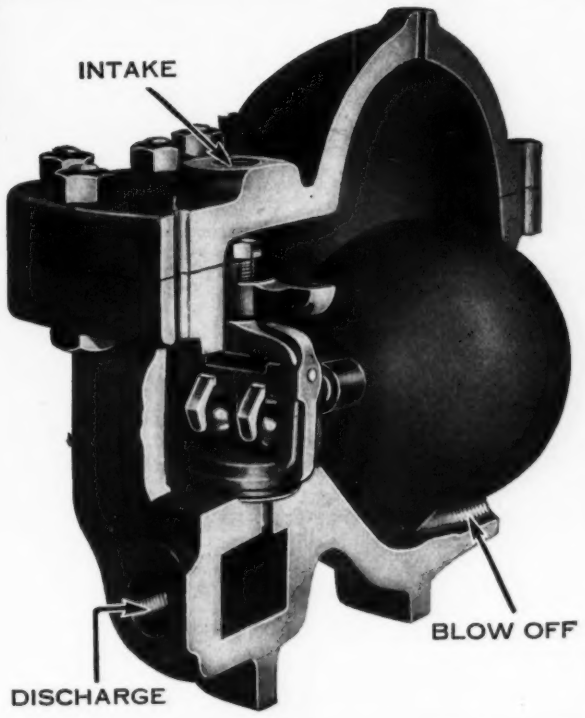

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IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING OCTOBER 24, 1931

SUMMARY

Cigarette paper .....758 cs.
Wall paper .....7 bls., 22 cs.
Paper hangings.....6 bls.
Painted paper.....6 cs.
News print .....763 rolls
Printing paper.....148 rolls, 77 cs.
Coated paper.....8 cs.
Wrapping paper ..... 1 roll, 18 cs.
Parchment paper.....5 cs.
Note books .....15 cs.
Transfer paper.....3 cs.
Filter paper.....73 bls., 75 cs.
Drawing paper.....40 cs.
Metal coated paper.....185 cs.
Gold coated paper.....7 cs.
Surface coated paper.....18 cs.
Crepe paper.....2 cs.
Colored paper.....10 cs.
Decalcomania paper.....23 cs.
Tissue paper.....6 cs.
Adhesive paper.....6 cs.
Ivory board .....9 rolls, 17 cs.
Bowl paper.....5 bls.
Envelopes .....21 cs.
Writing paper.....6 cs.
Stencil paper.....2 cs.
Paste board .....49 cs.
Card board .....17 cs.
Miscellaneous paper.....104 rolls, 376 bls., 46 cs.

CIGARETTE PAPER

Champagne Paper Corp., McKeesport, Havre, 365 cs.
Brown & Williamson Tobacco Co., Carinthia, Southampton, 35 cs.
Brown & Williamson Tobacco Co., Majestic, Southampton, 25 cs.
Brown & Williamson Tobacco Co., Ile de France, Havre, 10 cs.
American Tobacco Co., Ile de France, Havre, 300 cs.
Standard Products Corp., Ile de France, Havre, 23 cs.

WALL PAPER

Bush Service Corp., Rotterdam, Rotterdam, 1 cs.
A. L. Diament & Co., Majestic, Southampton, 1 cs.
R. E. Thibout, Majestic, Southampton, 1 cs.
Guaranty Trust Co., A. Ballin, Hamburg, 7 cs.
Davies Turner & Co., A. Ballin, Hamburg, 12 cs.
R. F Downing & Co., A. Ballin, Hamburg, 1 bl.
Globe Shipping Co., A. Ballin, Hamburg, 6 bls.

PAPER HANGINGS

W. H. S. Lloyd & Co., Minnewaska, London, 6 bls.

PAINTED PAPER

Rose Cumming, Ile de France, Havre, 6 cs.

NEWS PRINT

Jay Madden Corp., Berlin, Bremen, 126 rolls.
Perkins, Goodwin & Co., Berlin, Bremen, 119 rolls.
Stora Kopparberg Corp., Kungsholm, Gothenburg, 48 rolls.
Perkins Goodwin & Co., Pr. Harding, Hamburg, 279 rolls.
——, A. Ballin, Hamburg, 191 rolls.

PRINTING PAPER

International F'd'g Co., E. Francqui, Antwerp, 8 cs.
E. Dietzgen & Co., Rotterdam, Rotterdam, 45 cs.
C. Steiner, Berlin, Bremen, 4 cs.
Japan Paper Co., Carinthia, Southampton, 3 cs.
J. E. Bernard & Co., C. of Alton, Rotterdam, 148 rolls.
E. Dietzgen & Co., Lorain, Havre, 5 cs.
Keuffel & Esser Co., Lorain, Havre, 5 cs.
Keuffel & Esser Co., Pr. Harding, Hamburg, 7 cs.

COATED PAPER

W. A. Foster & Co., Minnewaska, London, 1 cs.
W. A. Foster & Co., Missouri, London, 6 cs.
Happel & MacAvoy, A. Ballin, Hamburg, 1 cs.

WRAPPING PAPER

Standard Products Corp., Westernland, Antwerp, 14 cs., 1 roll.
F. C. Strype, Westernland, Antwerp, 3 cs.
Sylvania Industrial Corp., Westernland, Antwerp, 1 cs.

PARCHMENT PAPER

Bendix Paper Co., A. Ballin, Hamburg, 5 cs.

NOTE BOOKS

Keuffel & Esser Co., Pr. Harding, Hamburg, 15 cs.

TRANSFER PAPER

Fuchs & Lang Manfg. Co., Pr. Harding, Hamburg, 3 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., Carinthia, Liverpool, 60 bls., 21 cs.
E. Fougera, Majestic, Southampton, 50 cs.
A. Giese & Son, Majestic, Southampton, 13 bls.
American Express Co., Lorain, Havre, 4 cs.

DRAWING PAPER

Devoe & Reynolds Co., Minnewaska, London, 1 cs.
Keuffel & Esser Co., Pr. Harding, Hamburg, 39 cs.

METAL COATED PAPER

Winter, Wolff & Co., Rotterdam, Rotterdam, 146 cs.
K. Pauli Co., Berlin, Bremen, 6 cs.
Globe Shipping Co., Bremen, Bremen, 1 cs.
K. Pauli Co., A. Ballin, Hamburg, 31 cs.
——, A. Ballin, Hamburg, 1 cs.

GOLD COATED PAPER

F. Murray Hill Co., Berlin, Bremen, 7 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Westernland, Antwerp, 16 cs.
Globe Shipping Co., A. Ballin, Hamburg, 2 cs.

CREPE PAPER

American Express Co., Berlin, Bremen, 2 cs.

COLORED PAPER

F. B. Vandergrift & Co., Berlin, Bremen, 2 cs.
S. Gilbert, Berlin, Bremen, 4 cs.
J. Beckhard, Berlin, Bremen, 4 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Britannic, Liverpool, 2 cs. (duplex).
C. W. Sellers, Bremen, Bremen, 8 cs.
C. W. Sellers, A. Ballin, Hamburg, 11 cs.
J. E. Bernard & Co., A. Ballin, Hamburg, 1 cs.
Phoenix Shipping Co., A. Ballin, Hamburg, 2 cs.

TISSUE PAPER

B. F. Drakenfeld & Co., Britannic, Liverpool, 3 cs.
G. W. Sheldon & Co., Majestic, Southampton, 1 cs.
W. J. Byrnes & Co., Majestic, Southampton, 2 cs.

ADHESIVE PAPER

Heemsoth Basse & Co., Rotterdam, Rotterdam, 6 cs.

IVORY BOARD

Coy, Disbrow & Co., Rotterdam, Rotterdam, 9 rolls, 3 cs.
F. C. Strype, Rotterdam, Rotterdam, 14 cs.

BOWL PAPER

Hurley Johnson Corp., Britannic, Liverpool, 5 bls.

ENVELOPES

J. Beckhard, Berlin, Bremen, 19 cs.
Globe Shipping Co., Pr. Harding, Hamburg, 2 cs.

WRITING PAPER

Thomas & Pierson, Carinthia, Liverpool, 1 cs.
Japan Paper Co., Majestic, Southampton, 2 cs.
Guibout Freres, Majestic, Southampton, 2 cs.
B. Altman & Co., Ile de France, Havre, 1 cs.

STENCIL PAPER

Bush Service Corp., American Trader, London, 2 cs.

PASTE BOARD

Roger & Galet, Ile de France, Havre, 49 cs.

CARD BOARD

American Express Co., A. Ballin, Hamburg, 17 cs.

MISCELLANEOUS PAPER

——, Carinthia, Southampton, 1 cs.
Wilkinson, Grey & Co., Kungsholm, Gothenburg, 23 cs.
Kreamer & Co., Kungsholm, Gothenburg, 376 bls.
The Borregaard Co., Inc., Kungsholm, Gothenburg, 104 rolls.
Keller, Dorian Paper Co., Majestic, Southampton, 4 cs.
Bush Service Corp., Bremen, Bremen, 8 cs.
Rohner, Gehrig & Co., Ile de France, Havre, 7 cs.
Watch Tower Bible & Tract Society, A. Ballin, Hamburg, 2 cs.
J. J. Shore & Co., A. Ballin, Hamburg, 1 cs.

RAGS, BAGGINGS, ETC.

L. Rosenbaum & Co., McKeesport, Havre, 19 bls. rags.
V. Galaup, McKeesport, Havre, 41 bls. rags.
I. Hinerfeld, McKeesport, Havre, 8 bls. rags.
——, Tuscania, Glasgow, 57 bls. paper stock.
S. Birkenstein & Son, The Angeles, B. Ayres, 90 bls. jute cuttings; 70 bls. rags.
S. Birkenstein & Son, Exiria, Valencia, 60 bls. rags.
——, Excalibur, Alexandria, 38 bls. bagging.
M. Snedeker Corp., Hoxie, Belfast, 146 bls. paper stock.
Banco Coml. Italiana Trust Co., Excelsior, Genoa, 66 bls. bagging.
Chemical Bank & Trust Co., Excelsior, Genoa, 87 bls. rags.
Darmstadt, Scott & Courtney, Lorain, Havre, 268 bls. bagging.
V. Galaup, Lorain, Havre, 48 bls. rags.
Leshner Corp., Lorain, Havre, 2 bls. rags.
Irving Trust Co., Pr. Harding, Hamburg, 77 bls. rags.
Darmstadt, Scott & Courtney, Cabo Mayor, Malaga, 142 bls. rags.
Castle & Overton, Inc., Cold Harbor, Manchester, 41 bls. rags.
C. Nelson, Cold Harbor, Manchester, 8 bls. new cuttings.
Chemical Bank & Trust Co., A. Ballin, Hamburg, 96 bls. bagging.
Bank of New York & Trust Co., Southern Prince, B. Ayres, 44 bls. bagging; 6 bls. cuttings.

OLD ROPE

International Purchasing Co., Excalibur, Genoa, 166 coils.

CHINA CLAY

Whitaker, Clark & Daniels, Hoxie, Bristol, 260 bags.

WOOD PULP

Castle & Overton, Inc., Rotterdam, Rotterdam, 1005 bls. wood pulp.

(Continued on page 86)

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Super Calenders
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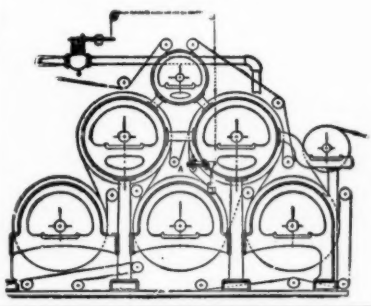

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will do everything we claim for it and more. The test costs you nothing until you are satisfied. Many mills tried one and now have every machine equipped. Write for list of users and other information.

W. F. PICKLES **Buckland, Conn.**

Imports of Paper and Paper Stock

(Continued from page 84)

Irving Trust Co., Berlin, Bremen, 875 bls. wood pulp.
Castle & Overton, Inc., Kungsholm, Gothenburg, 1034 bls. wood pulp.
E. M. Sergeant & Co., Kungsholm, Gothenburg, 449 bls. kraft soda pulp.
Perkins, Goodwin & Co., Kungsholm, Gothenburg, 508 bls. sulphite; 102 bls. sulphate.
Parsons ⅞ Whittemore, Inc., Kungsholm, Gothenburg, 360 bls. krapt pulp.
M. Gottesman & Co., Inc., Kungsholm, Gothenburg, 150 bls. sulphite.
Lagerloef Trading Co., Kungsholm, Gothenburg, 810 bls. sulphite; 640 bls. sulphate.
Bulkley, Dunton & Co., Kungsholm, ——, 360 bls. wood pulp.
Price & Pierce, Ltd., Kelkheim, Hernosand, 900 bls. sulphite, 150 tons.
J. Andersen & Co., Kelkheim, Hernosand, 3150 bls. sulphite, 525 tons.
Pagel, Horton & Co., Inc., Kelkheim, Gefle, 5000 bls. sulphite.
Stora Kopparberg Corp., Kelkheim, Gefle, 750 bls. wood pulp.
Kopparberg & Hofors Sag. Akt., Kelkheim, Norrsundet, 5500 bls. sulphate.
Price & Pierce, Ltd., Kelkheim, Wallvik, 1800 bls. sulphite, 300 tons.
——, Kelkheim, Iggesund, 2375 bls. sulphate, 475 tons.
M. Gottesman & Co., Inc., Kelkheim, Iggesund, 3500 bls. sulphite, 700 tons.
Castle & Overton, Inc., A. Ballin, Hamburg, 1338 bls. wood pulp, 268 tons.

PULPWOOD

Amtorg Trading Corp., (Albany), Bird City, Leningrad, 1906 cords.
Amtorg Trading Corp., (Albany), Cliffwood, Leningrad, 3198 cords.

WOOD FLOUR

State Chemical Co., Rotterdam, Rotterdam, 800 bags.
Trust Co. of New Jersey, Rotterdam, Rotterdam, 400 bags.
——, Kungsholm, Gothenburg, 40 bags.
State Chemical Co., City of Alton, Rotterdam, 557 bags, 34770 kilos.
The Burnet Co., City of Alton, Rotterdam, 60 bls., 3000 kilos.

BOSTON IMPORTS

WEEK ENDING OCTOBER 24, 1931

Baring Bros. & Co., Missouri, London, 210 bls. waste paper.
Crocker, Burbank & Co., Missouri, London, 255 bls. waste paper.

BALTIMORE IMPORTS

WEEK ENDING OCTOBER 24, 1931

Congoleum Nairn Co., McKeesport, Havre, 138 bls. rags.
S. Shapiro, McKeesport, Dunkirk, 79 bls. rags.
——, Cold Harbor, Liverpool, 123 coils old rope.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 24, 1931

H. J. Baker & Bro., The Angeles, B. Ayres, 666 bls. glue stock.
Philadelphia National Bank, Exiria, Barcelona, 279 bls. rags.
E. J. Keller Co., Inc., Exiria, ——, 187 bls. rags.
E. J. Keller Co., Inc., Excalibur, ——, 243 bls. rags.
——, Excelsior, Alicante, 76 bls. rags.
National Vulcanized Fibre Co., Lorain, Dunkirk, 167 bls. rags.
National Vulcanized Fibre Co., Lorain, Havre, 61 bls. rags.
V. Galaup, Lorain, Havre, 43 bls. rags.

NEWPORT NEWS IMPORTS

WEEK ENDING OCTOBER 24, 1931

Price & Pierce, Ltd., Kelkheim, Gefle, 2400 bls. sulphite.
Kopparberg & Hofors Sag. Akt., Kelkheim, Norrsundet, 2000 bls. sulphate.
Price & Pierce, Ltd., Kelkheim, Wallvik, 3360 bls. sulphite, 560 tons.
——, Kelkheim, Iggesund, 20 bls. wood pulp, 4 tons.
M. Gottesman & Co., Inc., Kelkheim, Iggesund, 1000 bls. sulphite, 200 tons.
Pagel, Horton & Co., Inc., Kelkheim, Husum, 2400 bls. sulphate, 406 tons.

Bathurst Installs Kraft Board Equipment

Bathurst Power and Paper Company, Ltd., of Bathurst, N. B., Canada, is now manufacturing kraft Fourdrinier board at its kraft pulp mill, which had been shut down in July, 1930, owing to market conditions.

The board is being made on one of the news print units, a 160-inch Walmsley Fourdrinier machine. It was necessary to make some changes in the machine to make it suitable for the manufacture of board and some new equipment, including five Jordan refiners, had to be purchased.

Total outlay up to the present time is something more than $100,000. The company is now manufacturing board, but expects that it will have to expend from $40,000 to $45,000 more for additional equipment before it will be in good shape to make all sizes and lines of kraft board. The ultimate production is estimated at 70 tons per day.

Wisconsin Mills May Curtail Output

APPLETON, Wis., October 26, 1931—Restriction of production to overcome market surpluses may be tried with the paper industry in Wisconsin as it has with the lumber industry. Conferences are to be arranged looking towards a mutual plan the aim of which, according to Governor Philip M. LaFollette, is to provide regular employment as far as possible among workers and to cope with the economic problem of over-production.

Under this plan the paper manufacturers would enter into a contract with the Governor, representing the State of Wisconsin, in which all agree to keep the production within certain limits, presumably a basis which will not load up the markets and will enable mills to reduce warehouse stocks. The contract would be subject to cancellation by the State at any time it is evident it works to disadvantage, especially if it might inflate prices by creating a scarcity of supply.

This system was first applied to the lumber industry, whose contract provides that production will be kept at 28 per cent of the annual output for the years 1927, 1928 and 1929, in order to prevent the extensive over-production that has been going on. The paper industry is so closely related to timber operations of the saw mills that it has deemed advisible by R. B. Goodman and Adjutant General Ralph M. Immell, of the Wisconsin Conservation Commission, to link the pulp and paper industry with the agreements.

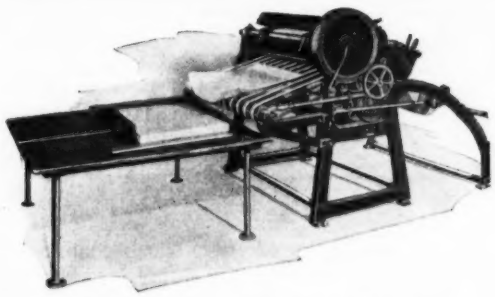
This matter will be considered by the governor's executive council, of which F. J. Sensenbrenner, president of the Kimberly-Clark Corporation, is a member.

New Barker In Operation At Port Alice, B. C.

The new barker of the British Columbia Pulp and Paper Company has been installed and is in active operation at the company's plant at Port Alice, B. C. According to official statements, the company is experiencing some of the difficulties which confront a pioneer in any field as regards the use of its barker, but despite this fact it has the new machinery in daily operation and production and many problems have been ironed out. The barker, which is reported to be one of the largest in the world, is capable of handling logs ten feet long with a diameter up to 22 inches. The entire project was installed at a cost of about $100,000.

New Universal Unaflow Booklet

The Skinner Engine Company, of Erie, Pa., have issued an attractive booklet, featuring illustrations of the plants of the users of Universal Unaflow horizontal and vertical steam engines. These engines are used in many of the leading paper mills.



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SUPERCALENDERED and MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS

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New York City - Chicago - Boston - Philadelphia - Pittsburgh - Syracuse

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 28, 1931.

Some improvement was noticed in the local paper market during the past week. Demand for the various standard grades of paper was more persistent and the outlook for the closing months of the year is brighter. Sales forces of the leading paper houses are still conducting a strenuous campaign for orders. Prices are somewhat irregular.

Production of news print paper is being maintained in sufficient volume to take care of current requirements. Contract shipments are going forward in fairly satisfactory volume, considering the general business depression. Competition for new business is exceptionally keen and there are reports of concessions on extra large orders.

Demand for the various grades of paper board is only moderately active. Box board production has been curtailed slightly. The price situation is unsatisfactory. The fine paper market is exhibiting a fairly steady trend. Tissues are going forward in seasonal volume. The coarse paper market is quiet and kraft wrapping paper prices have again declined.

Mechanical Pulp

The position of the ground wood market is practically unchanged. Both domestic and imported mechanical pulp are in fairly satisfactory request for the time of year. Due to the fact that production has been keyed to consumption, accumulations are not excessive and prospects for the near future are encouraging. Prices are steady, in most instances.

Chemical Pulp

No radical changes were reported in the chemical pulp market. Paper mill demand for the various grades of imported and domestic chemical pulp is rather restricted at present. The contract movement is moderate. Inquiries for future needs, however, are fairly numerous, some of which should materialize in good orders.

Old Rope and Bagging

Quietness reigns in the old rope market. Demand for domestic and foreign old manila rope is listless. Small mixed rope is moving slowly. Prices are nominal. The bagging market is dull. While scrap bagging is fairly steady, gunny bagging is not arousing much interest.

Rags

Most of the business transacted in the domestic rag market was along routine lines. Demand for cotton rags is below normal for the time of the year. Roofing grades are in somewhat better request. Mixed rags are marking time. The imported rag market continues unsettled, due to fluctuations in foreign exchange.

Waste Paper

Steadiness prevails in the paper stock market. While board mill demand for the lower grades has slackened somewhat, offerings are limited and prices are steady to firm. The better grades of paper stock continue active. Book stock is going forward at a satisfactory pace. Prices are practically unchanged.

Twine

Trading in the local twine market was fairly active during the past week. Sales booked were well up to the average of the corresponding period of the preceding year, and the outlook for the immediate future is promising. Prices are generally holding to previously quoted levels, despite keen competition for desirable business.

PROFITS AND HANDLING COSTS

(Continued from page 82)

gripping capacities are concerned, is quite light and can readily be removed by hand should lack of headroom necessitate disengaging the crane hook before removing the grab.

For a satisfactory mill handling system, some one or another of the methods that have been touched upon may be desirable, though probably the best results are to be secured when a combination of carefully selected methods is employed. In fact, such selection of suitable and fitting methods underlies the handling requirements of every firm engaged in commercial paper making. The proper selection necessitates the separation, evaluation and correct apportionment of all expenses directly or indirectly influenced by the movement of the finished stock and of its various material ingredients.

Expert accounting is essential, costs must be segregated, but if this is done there is not a paper mill or large consumer of paper mill products that cannot effect some worthwhile reductions in handling costs. There are many good materials handling tools available and low cost handling is dependent upon using the best suited tool for each handling operation. Every handling process, each step in the movement of the materials, is well deserving of consideration, particularly when business is not so good.

Awards for Government Paper

WASHINGTON, D. C., October 28, 1931—The R. P. Andrews Paper Company has been awarded the contract for furnishing the Government Printing Office with 40,000 pounds (20,000 sheets) of hard rolled binders board, No. 2 quality at 3.1 cents per pound, bids for which were received on October 16.

The Mathers-Lamm Paper Company will furnish 40,000 pounds (16,000 sheets) of No. 2 quality hard rolled binders board at 3.132 cents per pound, bids for which were received on October 5.

The Whitaker Paper Company will furnish 1,100 sheets of 20 x 25 green gummed paper at $5.75 per ream, bids for which were received on October 9. Philip Rudolph & Son, Inc., will furnish 500 sheets of 26 x 38 pulp board at 4.375 cents per pound, bids for which were received on September 23.

EXTENSION MODEL

Cambridge Surface Pyrometer

is an instrument which applied to the surface of a dryer or calender roll, instantly indicates the exact surface temperature. Its use enables the operator to locate water logged rolls and to maintain every roll at the correct temperature for efficient progressive drying.

The instrument is compact, rugged and easy to read. The extension rod permits temperature checking across the entire roll. Scale ranges are 50-250° and 50-400°F.

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AGENTS

PRICE & PIERCE, Ltd.,

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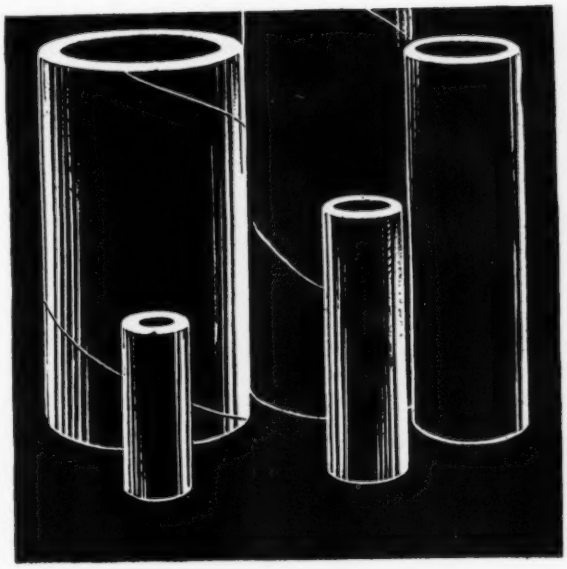

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Perhaps you require special types of cores for your own particular purpose. Let us know the specifications of your individual requirements and we shall send you samples and prices promptly.

CLIMAX CORE
TRADE MARK

Nonreturnable
Paper Cores
For All
Winding Purposes

CLIMAX TUBE CO.
MYSTIC, CONN.

Mills: MYSTIC, CONN.—LOWELL, MASS.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 28, 1931.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Demand is moderately active. The pulp is still quoted at from $42.50 to $45.00 per ton, while the powder is selling at from 3¾ cents to 4½ cents per pound, in barrels, at works.

BLEACHING POWDER.—Conditions in the bleaching powder market are fairly satisfactory. Contract shipments are going forward at a seasonal pace. Prices remain unchanged. Bleaching powder is quoted at from $1.75 to $2.00 per 100 pounds, in drums, at works.

CASEIN.—The casein market is fairly steady. Domestic casein is quoted at 7 cents and finely ground at 7½ cents per pound. Argentine standard ground is selling at 8½ cents and finely ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Supplies of caustic soda are moving into consumption in fairly good volume. Solid caustic soda is quoted at from $2.50 to $2.55; while the flake and the ground are selling at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY.—The china clay market is quiet. Affected by the foreign exchange situation prices are easier. Imported china clay is quoted at from $11 to $18 per ton, ship side. Domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE.—Demand for chlorine is fairly persistent. Shipments against contract are going forward to the paper mills with regularity. Prices are unchanged. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is slightly firmer. Grades of gum rosin used in the paper mills are now quoted at from $3.90 to $4.00 per 280 pounds, in barrels, at works. Wood rosin is selling at $3.70 per 280 pounds, in barrels, on dock, car lot quantities.

SALT CAKE.—Trading in the salt cake market is rather light. Prices are easier. Salt cake is quoted at from $15 to $16; chrome salt cake at from $13 to $14 per ton, in bulk, at works. Imported salt cake is selling at from $15 to $15.50 per ton, ship side.

SODA ASH.—Some improvement was noticed in the soda ash market. The contract movement is well up to average. Prices are steady. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.00; in bags, $1.25; and in barrels, $1.38.

STARCH.—Paper mill demand for starch is moderately active, with most of the business transacted being along routine lines. Prices remain unchanged. Special paper making starch is quoted at $2.67, in bags and at $2.94 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is displaying a strong tone. Prices are holding to schedule. Commercial grades are quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is unchanged. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton for any smaller quantity over that period. On spot and nearby carloads, the quotation is $21 per ton.

TALC.—Business in the talc market is dull. Demand from the paper mills is restricted. Prices are unchanged. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at mine; while imported talc is selling at from $18 to $22 per ton, in bags, ship side.

Market Quotations

Paper

(F. o. b. Mill)		
Ledgers	7.50	@38.00
Bonds	6.00	@53.25
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine sized	6.75	@11.00
Book, Cased—		
S. & S. C.	5.25	@ —
M. F.	5.00	@ —
Coated and Enamel	6.75	@10.25
Lithograph	7.25	@11.75
Tissues—Per Ream—		
White No. 1	.65	@ .70
Anti-Tarnish M. G. only	.65	@ .70
Colored	.70	@ .90
White No. 2	.55	@ .60
Kraft	.65	@ .70
Manila	.55	@ .60
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.00	@ 5.25
No. 2 Wood	3.50	@ 4.00
Butchers	3.37½	@ —
Fibre Papers—		
No. 1 Fibre	4.25	@ 5.50
No. 2 Fibre	4.00	@ 4.75
Common Bogus	1.50	@ 3.00
Screenings	2.00	@ 3.00
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs., No. 1	.09¼	@ —
No. 2	.11¼	@ —
Bleached, basis 20 lbs.	.11¼	@ —
(Delivered New York)		
News, per ton—		
Rolls, contract	57.00	@ —
Rolls, spot	57.00	@ —
Sheets	62.00	@ —
Side Runs	42.00	@46.00
Kraft—		
No. 1 Domestic	4.50	@ 5.75
No. 2 Domestic	3.00	@ 4.25
Southern	2.75	@ 4.00
Imported	6.00	@ 7.00
Boards—per ton—		
News	26.00	@27.50
Straw	34.50	@45.00
Chip	25.00	@27.50
Binders' Boards	62.00	@70.00
Standard 85 Test Liner	32.50	@35.00
Sgl. Mla. Ll. Chip	37.50	@42.50
(F. o. b. Mill)		
Wood Pulp Boards	70.00	@80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—		
Moist	24.00	@26.00
Dry	25.00	@26.50
(F. o. b. Mill)		
No. 1 Domestic	25.00	@30.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	2.40	@ 3.50
Easy Bleaching	2.00	@ 2.10
No. 1 strong unbleached	1.75	@ 2.15
Mitscherlich unbleached	1.80	@ 2.10
No. 2 strong unbleached	1.70	@ 1.80
No. 1 Kraft	1.50	@ 1.75
No. 2 Kraft	1.40	@ 1.50
Sulphate—		
Bleached	2.75	@ 3.25
(F. o. b. Pulp Mill)		
Sulphite (Domestic)—		
Bleached	2.25	@ 4.50
Easy Bleaching	2.15	@ 2.35
News	1.80	@ 2.50
Mitscherlich	2.40	@ 2.55
Kraft (Domestic)	1.60	@ 2.75
(Delivered Paper Mills)		
Soda Bleached	2.75	@ —

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	6.50	@ 7.00
New White, No. 2	5.50	@ 6.00
Silesias No. 1	5.25	@ 5.50
New Unbleached	7.00	@ 7.50
New Blue Prints	4.00	@ 4.50
New Soft Blacks	3.50	@ 4.00
Blue Overall	5.00	@ 5.25
Fancy	3.00	@ 3.50
Washables	2.75	@ 3.00
Mixed Khaki Cuttings	3.50	@ 4.00
Pink Corset Cuttings	5.00	@ 5.50
O. D. Khaki Cuttings	4.50	@ 4.75
Men's Corduroy	3.00	@ 3.50
New Mixed Blacks	3.00	@ 3.25

Old Rags

White, No. 1—		
Repacked	5.25	@ 5.75
Miscellaneous	4.25	@ 4.75
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.30	@ 2.50
St. Soiled, White	1.50	@ 1.75
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.65	@ 1.85
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.25	@ 1.30
No. 1	1.25	@ 1.30
No. 2	.90	@ 1.00
No. 3	.70	@ .80
No. 4	.65	@ .70
No. 5A	.50	@ .60

Foreign Rags

New Rags

New Dark Cuttings	1.75	@ 1.85
New Mixed Cuttings	2.00	@ 2.20
New Light Silesias	4.50	@ 4.75
Light Flannelettes	4.25	@ 4.50
Unbleached Cuttings	6.00	@ 6.25
New White Cuttings	5.25	@ 5.50
New Light Oxfords	4.00	@ 4.25
New Light Prints	3.00	@ 3.25

Old Rags

No. 1 White Linens	6.00	@ 6.25
No. 2 White Linens	5.00	@ 5.25
No. 3 White Linens	3.50	@ 4.00
No. 4 White Linens	2.00	@ 2.50
No. 1 White Cotton	4.25	@ 4.75
No. 2 White Cotton	3.25	@ 3.50
No. 3 White Cotton	2.50	@ 3.00
No. 4 White Cotton	1.45	@ 1.60
Extra Light Prints	1.90	@ 2.10
Ord. Light Prints	1.60	@ 1.75
Med. Light Prints	1.40	@ 1.55
Dutch Blue Cottons	1.50	@ 1.60
French Blue Linens	2.25	@ 2.40
German Blue Linens	2.00	@ 2.10
German Blue Cottons	1.35	@ 1.40
Checks and Blues	1.25	@ 1.30
Lindsay Garments	.90	@ 1.00
Dark Cottons	.70	@ .75
Old Shopperies	.65	@ .70
New Shopperies	.60	@ .65
French Blues	1.40	@ 1.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.50	@ 1.55
Domestic	1.60	@ 1.65
Wool Tares, light	1.05	@ 1.10
Wool Tares, heavy	1.10	@ 1.15
Bright Bagging	1.05	@ 1.10
Small Mixed Rope	.90	@ 1.00
Manila Rope—		
Foreign	1.65	@ 1.75
Domestic	1.75	@ 1.90
New Burlap Cut	1.70	@ 1.80
Hessian Jute Threads—		
Foreign	2.60	@ 2.75
Domestic	2.80	@ 3.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, white, No. 1	2.65	@ 2.85
Hard, white, No. 2	2.10	@ 2.20
Soft, white, No. 1	2.10	@ 2.20
White envelope cuttings	2.35	@ 2.50
Flat Stock—		
Stitchless	.70	@ .80
Overissue Mag	.70	@ .80
Solid Flat Book	.60	@ .70
Crumpled No. 1	.48	@ .53
Solid Book Ledger	1.75	@ 1.85
Ledger Stock	.65	@ .75
New B. B. Chips	.20	@ .30
Manilas—		
New Env. Cut	1.75	@ 1.85
New Cuttings	1.40	@ 1.50
Extra No. 1 old	1.10	@ 1.25
Print	.45	@ .50
Bogus Wrapper	.45	@ .50
Container	.30	@ .35
Old Kraft Machine—		
Compressed bales	1.20	@ 1.30
News—		
No. 1 White News	1.60	@ 1.65
Strictly Overissue	.35	@ .45
Strictly Folded	.35	@ .40
No. 1 Mixed Paper	.25	@ .30
Common Paper		Nominal

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600 TONS DAILY
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H. T. BRAND
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HIGH GRADE FILLER

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TRIMBEY MACHINE WORKS

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Manufacturers of

WEIGHT REGULATORS
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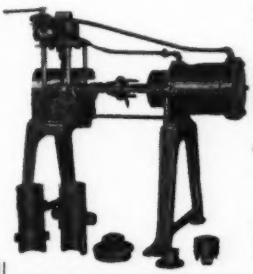
PROPORTIONING AND METERING SYSTEMS
PULP SCREENS—FLOAT VALVES

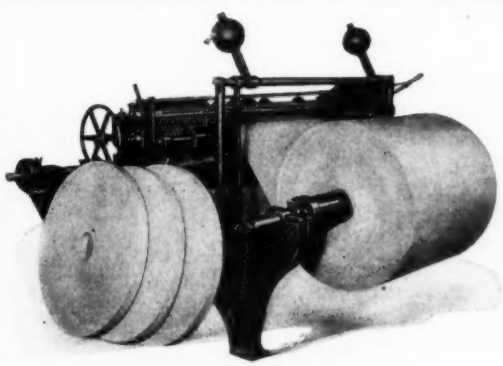


The New Paper Core Metal Tip Remover and Reconditioner

REMOVES ENDS AND RECONDITIONS THEM FASTER THAN ANY OTHER DEVICE.

SIMPLE TO OPERATE—NO PARTS TO GET OUT OF ORDER—POSSIBLE TO SHORTEN CORES TO FRACTION OF INCH—SAVES TIME, WASTE AND MONEY. WRITE FOR DESCRIPTIVE FOLDER.

CORNER BROOK FOUNDRY & MACHINE CO.
BATH, MAINE



HEAVY DUTY SLITTER and REWINDER

Designed to meet the requirements of all users of Automatic Machines that take the stock from the roll, and require a roll of large diameter wound true and solid.

With this slitter, wide and narrow widths cut at the same time are of uniform tension. A roll slit and rewound 1″ wide and 48″ diameter can be handled without danger of spinning. At very little additional cost per ton paper mills equipped with this Slitter can furnish their customers with paper or board slit and rewound from 1″ width and up. Made in three widths: 48″—60″—72″.

INMAN MANUFACTURING COMPANY
AMSTERDAM, N. Y.

Manufacturers of
AUTOMATIC MACHINERY FOR PAPER BOXES AND ROTARY PAPER CUTTING MACHINERY

Twines

(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.13	@	—
No. 2	.11	@	—
Tube Rope—			
4-ply and larger	.09	@	—
Fine Tube Rope—			
4-ply	.11	@	—
3-ply	.12	@	—
2-ply	.13	@	—
Paper Makers Twine Balls	.07	@	—
Box Twine, 2-3 ply	.07	@	.08
Jute Rope	.09	@	.10
Amer. Hemp, 6	.27	@	.29
Java Sisal—			
No. 1 Basis	.10	@	—
No. 2 Basis	.09	@	—
New Zealand Sisal	.10	@	—
Sisal Lath Yarn—			
No. 1	.12	@	.14
No. 2	.10	@	.12
Manila Twine	.21	@	.22

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	4.50	@	5.00
Southern Kraft	3.00	@	3.25
No. 2 Kraft	3.00	@	3.25
Wood Rag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.07	@	.07¼
White Tissue	.07¼	@	.07½

(Delivered Central Territory)

News, per ton—			
Rolls, contract	57.00	@	—
Sheets	62.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	1.95	@	2.05
No. 1 Soft White	1.80	@	1.90
Ledger & Writings	.60	@	.70
Solid Books	.60	@	.70
Blanks	1.40	@	1.55
Krafts	1.15	@	1.25
New Kraft Cuts	1.30	@	1.45
Manila Env. Cuts	1.40	@	1.50
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.40	@	.50
Old Newspapers—			
No. 1	.35	@	.45
No. 2	.30	@	.35
Mixed Papers—			
No. 1	.25	@	.30
No. 2	.20	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.05	@	.40
Ledgers	.07	@	.40
Writings—			
Superfine	.12	@	.18
Extra fine	.16	@	.22
Fine	.15	@	.26
Fine, No. 2	.12	@	.25
Fine, No. 3	.07	@	.20
Book, M. F.	.04¾	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.07	@	.16
Coated Lithograph	.06	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.07	@	.09
Manila Sul., No. 1	.03¼	@	.05½
Manila No. 2	.03	@	.04
No. 1 Kraft	.05½	@	.06
No. 2 Kraft	.03¾	@	.04¼
Southern Kraft No. 1	—	@	.04
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04

(Delivered Philadelphia)

News Print Rolls	58.00	@	62.00
Straw Board	50.00	@	—
News Board	30.00	@	32.00
Chip Board	25.00	@	27.50
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	73.00	@	75.00
No. 2, per ton	63.00	@	65.00
Carload lots	62.00	@	67.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.06	@	.06½
New White, No. 2	.05	@	.05½
Light Silesias	.05	@	.05½
Silesias, No. 1	.06	@	.08
Black Silesias, soft	.05	@	—
New Unbleached	.06	@	.06½
Washable, No. 1	.02½	@	.03
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02	@	.02½
New Blue	.02	@	.02½
Fancy	.03	@	.03½
New Black Soft	.03	@	.03½
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed	.03	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.25	@	2.75
M. G.	4.50	@	—
Thirds and Blues—			
Miscellaneous	1.25	@	1.50
Repacked	1.75	@	2.00
Black Stockings (Export)	3.80	@	4.00
Roofing Stock—			
Foreign No. 1	1.15	@	1.25
Repacked	.80	@	.90

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	2.25	@	2.50
Sisal Rope	1.25	@	1.50
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.50
No. 2 Hard White	2.00	@	2.25
No. 1 Soft White	1.75	@	2.00
No. 2 Soft White	1.40	@	1.50
No. 1 Mixed	.75	@	.80
No. 2 Mixed	.50	@	.55
Solid Ledger Stock	1.35	@	1.40
Writing Paper	.80	@	1.00
No. 1 Books, heavy	.70	@	.75
No. 2 Books, light	Normal		
No. 1 New Manila	1.60	@	1.75
No. 1 Old Manila	1.25	@	1.30
Print Manila	.50	@	.55
Container Manila	.40	@	.45
Old Kraft	1.10	@	1.20
Common Paper	.30	@	.40
No. 1 Mixed Paper	.35	@	.45
Straw Board, Chip	.35	@	.45
Binders Board, Chip	.35	@	.45
Corrugated Board	.45	@	.50
Overissue News	.50	@	.55
Old Newspaper	.30	@	.35

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.12½
Rag Content	.15	@	.30
All Rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	.03½	@	.04

(F. o. b. Boston)

Southern Kraft	.03¼	@	.04

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)

Common Bogus	.02	@	.02¼

(Delivered New England points)

News Print, rolls	—	@	56.50
Straw Board, rolls	.009	—	@52.50
Straw Board in Sheets, basis 35s to 70s	—	@	50.00
Filled News Board	27.50	@	30.00
Chip Board	27.50	@	—
Chip Board (Creasing)	27.50	@	30.00
Single Manila Lined Chip	40.00	@	45.00
Single White, Patent Coated News Board—Binder	52.50	@	60.00
Wood Pulp Board	70.00	@	75.00
Binder Boards	67.50	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.50
No. 2 Hard White	2.25	@	2.50
No. 1 Soft White	1.90	@	2.10
No. 2 Mixed	.60	@	.65
No. 1 Mixed	.90	@	1.00
Solid Ledger Books	1.75	@	2.00
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	—	@	.45
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	—	@	1.00
White Blank News	1.50	@	1.60
Kraft No. 1	1.00	@	1.15
Manila	.90	@	1.00
No. 1 Mixed Paper	.25	@	.35
Print Manila	.40	@	.45
Overissue News	.40	@	.45
Old Newspapers	.32½	@	.40
Box Board, Chip	.20	@	.25
Corrugated Boxes	.37½	@	.47½

Bagging

(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.25
Domestic	—	@	1.25
Manila Rope—			
Foreign	1.50	@	1.75
Domestic	1.75	@	2.00
Transmission Rope	1.25	@	1.40
Mixed String	.50	@	.55
Jute Rope	1.00	@	1.15
Jute Carpet Threads	.75	@	.90
Bleachery Burlap	2.50	@	2.75
No. 1 Scrap Burlap	1.10	@	1.25
Scrap Sisal	1.35	@	1.45
Scrap Sisal for shredding	1.50	@	1.60
Wool Tares, heavy	1.25	@	1.30
New Burlap Cutting	1.50	@	1.25
Australian Pouches	2.00	@	2.25
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging	.90	@	1.05
Bagging No. 2	.50	@	—
No. 1 Burlap	—	@	3.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1	.06¼	@	.07
New White No. 2	—	@	.06
Silesias No. 1	.06	@	.06¼
New Black Silesias	.02½	@	.02¾
New Unbleached	—	@	.08
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades—			
Blue Overalls	.05	@	.06
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.50	@	2.75
Thirds and Blues—			
Repacked	1.60	@	1.80
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	—	@	.63
No. 2	—	@	.58
No. 3	—	@	.53

Foreign Rags

(F. o. b. Boston)

Dark Cottons	—	@	.70
New No. 1 White Shirt Cuttings	6.50	@	6.75
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.55	@	1.65
Old Linsey Garments	.80	@	.90

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	08½	@	—
No. 1 Colored	.11¾	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (carloads)	6.65	@	—
No. 3 M. F. (carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(Delivered Toronto)

News, per ton—			
Rolls (contract)	56.50	@	57.00
Sheets	61.50	@	—

Pulp

(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	44.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper

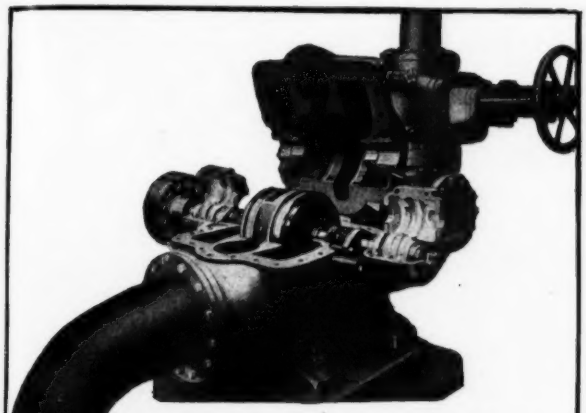
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.80	@	—
Soft White	2.60	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.10	@	—
Light and Crumpled Book Stock	1.20	@	—
Ledgers and Writings	—	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	.80	@	—
Kraft	1.90	@	—
News and Scrap—			
Strictly Overissue	.70	@	—
Strictly Folded	.70	@	—
No. 1 Mixed Paper	.60	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼



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ROLLS

CALENDER ROLLS
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Chilled Iron
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Refilling
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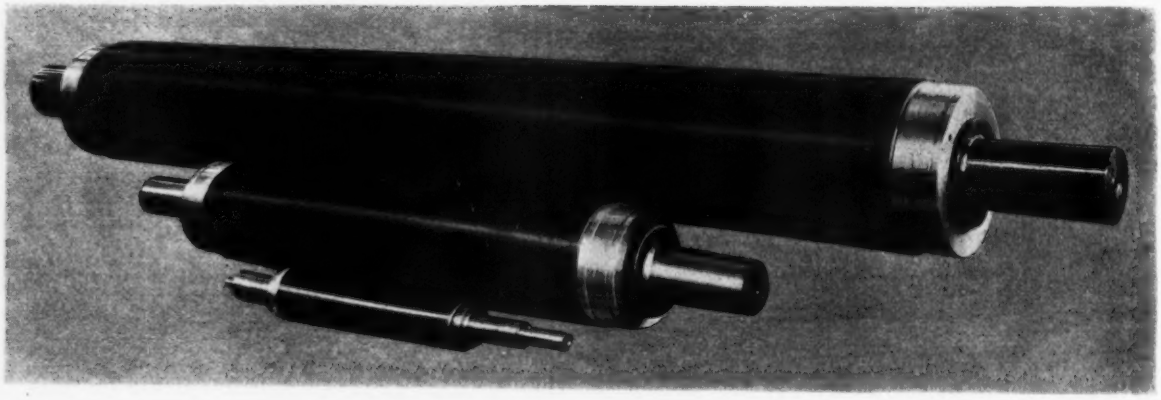

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